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IMPERIAL BUREAU OF ANIMAL HEALTH

THE

# VETERINARY BULLETIN

Vol. 9.] June, 1939. [No. 6.

## DISEASES CAUSED BY BACTERIA AND FUNGI

ALLISON, V. D. (1938). **Streptococcal Infections.**—*Lancet.* **234.** 1067-1070. 4 tables. [12 refs.]

After reviewing recent advances in the serological analysis of beta-haemolytic streptococci, A. gives examples of the way in which serological typing may be of value in tracing the source of infection. The Denham, Chelmsford and Doncaster outbreaks of tonsillitis and scarlet fever are quoted [*V. B.* **6.** 483, and **7.** 634]. He discusses the importance of accurate identification of streptococci by serological means in relation to the cross-infections which occur in hospital wards. Cases that are sometimes considered to be relapses may be due to fresh infection with streptococci of a different serological type.—D. L. HUGHES.

ANDERSON, E. O., & PLASTRIDGE, W. N. (1936). **A Report on a Control Program for Bovine Infectious Mastitis Based on Segregation of Infected Animals.** —*J. Dairy Sci.* **19.** 432.

Observations on the incidence of streptococcal mastitis in seven experimental herds in Connecticut over periods of 1-5 years are described. The results show that a segregation policy can reduce infection 50-100%, and that by this method infection-free herds can be built up.

I. WHITE, G. C., COUTURE, G. W., ANDERSON, E. O., JOHNSON, R. E., PLASTRIDGE, W. N., & WEIRETHER, F. J. (1937). **Chronic Bovine Mastitis and Milk Yield.**—*J. Dairy Sci.* **20.** 171-180. 2 tables, 3 graphs. [7 refs.]

II. SHAW, A. O., HANSEN, H. C., & NUTTING, R. C. (1937). **The Reliability of Selected Tests for the Detection of Mastitis.**—*Ibid.* 199-203. 1 table. [11 refs.]

I. Milk yields of cows negative to laboratory tests for mastitis were compared with yields from the same animals after they had been artificially infected and were in the incipient and mild stages of the disease. Two herds were used (comprising 52 animals) which were free from TB. and *Brucella abortus* infection, and comparatively free also from other disease conditions. Ninety normal and 108 infected lactations were recorded; cows with greatly diminished yields were excluded. The normal yield, calculated for a period equal to that of the experiment, of one herd (32 cows) whilst healthy was 9,557 lb., but when tests for mastitis were positive its yield calculated on the same basis was reduced by 463 lb. or 4·85%. In the other herd (22 cows) the loss was about the same. Apart from other considerations, the loss of milk alone would hardly justify disposal of cows positive

to tests for incipient mastitis. When only one quarter was involved the losses were slight, but they were increased as infection spread to other quarters. The loss was about 15-20% when all the quarters were affected.

II. An attempt was made to determine the relative accuracy of the more common laboratory tests for mastitis, by examining milk from five cows having acute mastitis, two cows with mild chronic mastitis, and three cows having no detectable infection. In all, 518 samples were examined during 14 days.

Samples were incubated for 12 hours and examined for streptococci. They were then plated on beef infusion agar with 1% dextrose and not less than 5% defibrinated blood. Leucocyte counts were made and chloride percentages and the pH were estimated. Haemolytic bacteria were demonstrated in 82·5% of samples from cows giving abnormal milk, in 25% from cows with mild chronic mastitis and in 1·9% from definitely negative cows. Streptococci were demonstrated in 92·5% of samples of abnormal milk, in 36·6% from cows with mild chronic mastitis, and in 7·1% from cows definitely free of mastitis. 100,000 or more cells were noted in 87·7% of abnormal milk samples, in 27·7% of samples from mild chronic mastitis and in 5·8% from negative cases.

Tests for chlorides and pH were extremely unreliable for the detection of cows affected with chronic mastitis.—H. E. Bywater.

Ward, A. H. (1938). **Preliminary Report on Inheritance of " Susceptibility " to Severe Udder Infection (Mastitis).**—*N.Z. J. Sci. Tech.* **20.** 109A-114A. 2 tables. [2 refs.]

W. analysed the records of nine herds comprising 709 daughter-dam pairs. The diagnosis of mastitis rested on the leucocytic assessment of gravity cream as elaborated at the Wallaceville Laboratory. The results of the examination provided apparently significant evidence that hereditary factors contribute towards " susceptibility " to mastitis.

The progeny history of twin sires appeared to support the above conclusion, but W. states that the support is subject to qualification owing to the small numbers used (25 dams in one case and 22 in the other).—L. W. N. Fitch.

I. Brocq-Rousseu, D., & Urbain, A. (1938). Sur la durée du pouvoir antigène du streptocoque gourmeux tué par l'alcool-éther. [**The Duration of the Antigenic Power of** *Str. equi* **Killed by Ethyl Alcohol**].—*C. R. Soc. Biol. Paris.* **127.** 1400-1401. [3 refs.]

II. Umeno, S. (1938). **On the Colony-Type of** *Streptococcus equi.* **I. Comparison of the Morphological, Cultural and Biological Characteristics between Three Isolated Colony-Types.**—*Kitasato Arch.* **15.** 262-283. 4 figs. on 1 plate, 6 tables. [Numerous refs.] [In English].

I. After being killed with alcohol and stored for 20 years, *Str. equi* possessed some antigenic power, but this was considerably diminished. Intravenous injection of a horse on three successive days with rising amounts of the preparation caused febrile symptoms. Twelve days later its serum contained only 15 antibody units, and had no protective value.

II. U. studied three colony types obtained by plating on agar 18-20 hour broth cultures of 60 stock and 27 freshly-isolated strains of *Str. equi.* The latter all belonged to a so-called " G " type, but older stock strains yielded colonies of a " C " type together with those of the " G " type. After 2-4 years in stock, only the " C " type was found, and among strains of over five years an " F " type occurred alone or with the " C " type. Differential characters on solid and in liquid media are described, as well as morphological features. Several tables

illustrate the relation between age of sub-culture and colony type, and the differences in haemolysis on solid and in liquid media, in antifluorescent action on films of *Pasteurella suiseptica*, and in fermentation tests.—R. O. MUIR.

GARGANGO, P. (1938). Sierovaccinoterapia nell'adenite equina. [**Sero-Vaccination against Strangles**].—*Azione vet.* **7.** 368-369.

An inadequate account of the treatment of seven cases of strangles with a strangles sero-vaccine.

STITZ, B. (1938). Die Diplokokken-Infektion bei Haustieren unter besonderer Berücksichtigung der Zugehörigkeit des Erregers zu den Pneumokokken. [**Diplococcal Infection of Domestic Animals and its Relation to Pneumococcal Infection**].—*Vet.-med. Nachr. Bayer-Meister Lucius.* **3.** 53-69. [16 refs.]

S. describes the occurrence of a specific disease of calves, sheep, horses and swine, caused by a diplococcus. He states that the disease occurs commonly in the above-mentioned animals and also in laboratory animals and in furbearers, and that the organism in question is really the pneumococcus. The disease is only encountered in a sporadic form, and no extensive outbreaks have been noted. Amongst cattle and sheep the disease chiefly affects young animals, and occurs as a septicaemia which generally ends fatally in the course of 1-2 weeks. Amongst horses the affection may apparently occur in a septicaemic form, a pneumonic form or as a chronic joint disorder. In swine the disease is a generalized condition frequently causing abortion in pregnant sows.

The appearance of the disease in the above animals is described in some detail, but it is stressed that neither in the symptomatology nor in the P.M. lesions are there characteristic features to aid diagnosis. In this connexion there is one exception, namely that the spleens of affected calves are said to have a characteristic elastic consistency. Diagnosis of the infection can only be made if a bacteriological examination reveals the presence of the pneumococci in the tissues and no other disease-producing organism or agent can be found.—E. J. PULLINGER.

I. BIGGER, J. W. (1937). **The Staphylococci Pathogenic for Man.**—*Brit. med. J.* Oct. 30th. 837-841. [Numerous refs.]

II. ANON. (1937). **The Immunology of Staphylococcal Infections.**—*Ibid.* 860-861.

I. A review of recent research on the toxins and other substances secreted by staphylococci, and of the methods of titrating antitoxic sera. The common staphylococcal infections of man and their treatment are discussed, and it is pointed out that although patients with chronic infections may have high contents of antitoxin, beneficial results may be obtained by immunization. Susceptibility to infection does not depend solely on antitoxin content, but also on other factors, such as general peculiarities of metabolism, skin and secretions. The use of both autogenous vaccines and of toxoid is advised.

II. This is an editorial article in which the value of antitoxin in treatment and the comparative values of toxoid and vaccines [mentioned in I, above] are discussed. It is pointed out that titration of antihaemolysin content is useless as a guide to the response induced by treatment. Animal experiments have shown that it is difficult to produce a high degree of immunity against staphylococci. Animals inoculated with live cultures may recover and develop antitoxin, but the cocci may survive in such tissue as kidney and bones, with resultant chronic osteomyelitis.—C. MCGAUGHEY.

ZIRONI, A. (1938). Sur la pathogénie des infections staphylococciques. [**The Pathogenesis of Staphylococcal Infections**].—*Rev. Immunol.* **4.** 130-145. [Numerous refs.]

Z. points out that since the discovery of formation of toxin by staphylococci there is too great a tendency to attribute the pathogenicity of staphylococci to the toxin, and to overestimate the value of antitoxin in connexion with prophylaxis. He maintains that whilst toxin plays an important part there are other very important factors to be considered. He compares his findings with those of other investigators, and gives his evidence for regarding the symptoms and anatomical lesions met with in such infections as being for the most part an expression of an allergic state.

—GWILYM O. DAVIES.

UMENO, S., & NOBATA, R. (1938). **On the Viability of Anthrax Spores.**—*J. Jap. Soc. vet. sci.* **17.** 221-223 of pt. 1. [5 refs.] [In Japanese: abst. from English summary p. 87 of pt. 2].

Anthrax spores stored in the laboratory survived for at least 40 years.

The identity of the growths obtained from the spores was established by the examination of cultural and microscopic characters, by the inoculation of mice, and by the precipitation test.—D. D. OGILVIE.

CURASSON, K. G. (1938). Sur l'action pathogène naturelle du bacille pyocyanique. [**Pathogenicity of** *Pseudomonas pyocyanea* (" *Bacillus pyocyaneus* ")].—*Bull. Serv. Zootech. Epiz. A.O.F.* **1.** No. 1. 1-6. [7 refs.]

The action of *Ps.p.* in animals is discussed from the pathological and bacteriological viewpoints. Symptoms produced in horses, sheep, dogs, fowls and pigeons are described in some detail, and the particular strains of the organism which infect each of these species are indicated. In horses, naso-pulmonary and intestinal symptoms are described; C's strain No. 1 was associated with cases in which the chief symptoms were naso-pulmonary and his strain No. 2 with those in which the chief symptoms were abdominal.

He stresses the comparative absence of P.M. signs, other than generalized congestion, especially of the liver, in animals dying from *Ps.p.* infection. He records the recovery of the organism in pure culture from heart blood and bone-marrow of a fowl.

Rabbits and g. pigs sometimes develop a secondary infection with *Ps.p.* following infection with anthrax bacilli, pasteurella, or salmonella. It is noted that the degree of pigment production varies with the strain.—H. BURROW.

LONG, E. R. (1938). **Tuberculosis, Leprosy and Allied Mycobacterial Diseases.** —*Science.* **87.** 23-31.

L. discusses the principal features of TB., leprosy, the " skin-lesion " disease of cattle, Johne's disease, rat " leprosy " etc., with a view to explaining why, when the causal organisms have so many features in common, there should be so much variability in the diseases produced.

It is stated that little is known of the chemistry of the body cells in the lesions, but much information is available concerning the chemistry of artificially grown mycobacteria. There are distinctive qualitative and quantitative differences between the lipoids, proteins and carbohydrates within members of the group of mycobacteria, and as these substances vary in their actions on the tissues, differences in the lesions are understandable. The lipoids are stated to stimulate the large mononuclear phagocytic cells and to lead to chronic changes, whereas the inflammatory exudations and toxic necroses are the result of protein, and

possibly carbohydrate action, particularly after " hypersensitiveness " has been induced in the course of the disease. The development of epithelioid cells is due to the dispersal of certain phosphatides and fatty acids derived from breakdown of the acid-fast bacilli. It is also stated that typical epithelioid tubercles can be induced at will in experimental animals by the injection of lipoids alone.

—GWILYM O. DAVIES.

SCHULTE, W. (1937). Ueber das Vorkommen von Tuberkulose in den innersekretorischen Drüsen beim Rinde. **[TB. of the Endocrine Glands in Cattle].**—*Inaug. Diss., Hanover.* pp. 31. [Numerous refs.]

Tuberculous lesions were found in the adrenal glands in five cases, and in the thyroid glands in one case, out of 82 cases of chronic TB. in cattle, but no lesions were found in the hypophyses, the pineal bodies, the thymus or the parathyroid glands in these cases. The size, the amount of reticulo-endothelial tissue, the function of these glands, and their blood supply are discussed in relation to these results.—A. T. PHILLIPSON.

FØLGER, A. F. (1938). Tuberkulosens patologiske Anatomi med saerligt Henblik paa Bestemmelse af tuberkuløses Processers Alder. **[The Pathological Anatomy of TB. with Special Reference to the Age of TB. Processes].**—*Medlemsbl. danske Dyrlaegeforen.* **21.** 289-303, 317-333, 347-359 and 373-380. 4 figs.

A survey is given of the modern views on the pathological anatomy of TB., especially as it has been modified by the works of HÜBSCHMANN and, in the field of veterinary science, by NIEBERLE.

The subject has been divided up as follows :– (1) organs in which " primary complexes " often develop ; (2) TB. of the lymph nodes, and (3) organs in which TB. processes develop as a tuberculous infection spreads and becomes generalized, forms of sensitization being also mentioned under this head. When the age of tuberculous processes is being judged, an exact and complete P.M. examination must be made. The new views are in many respects in agreement with regulations in force for meat inspection, but examples are mentioned where a revision seems to be necessary.—H. C. BENDIXEN (COPENHAGEN).

DEBELIĆ, Š. (1938). Tuberkuloza kod goveda zaklanih na zagrebačkoj klanici. **[TB. in Cattle Slaughtered at Zagreb, Yugoslavia].**—*Vet. Arhiv.* **8.** 460-467. 1 table. [German summary].

TB. was observed in 0·51 % of 200,000 adult cattle slaughtered at the Zagreb abattoir, Yugoslavia, during the past ten years. These figures show that TB. is fairly rare among Yugoslavian cattle, and that steps should be taken as soon as possible to control the disease.—B. OSWALD (KRIŽEVCI).

CRAIG, J. F., & DAVIES, G. O. (1938). **Tuberculosis in a Sheep.**—*Vet. Rec.* **50.** 1156-1157. 1 fig. [6 refs.]

Tuberculous lesions were observed in the submaxillary, mesenteric, hepatic, bronchial and mediastinal lymph nodes, and in the liver and lungs. The lungs were extensively involved and numerous caseo-calcareous nodules were distributed throughout the fibrous matrix. Numerous beaded tubercle bacilli were observed in the caseo-pus. Typical generalized tuberculous lesions were found in a g. pig and a rabbit after subcutaneous inoculation ; no lesions were found in two fowls. The infection appeared to be of bovine origin.—E. C. HULSE.

CARPANO, M. (1936). Sulla tubercolosi degli animali de giardini zoologici. [**TB. in Animals in Zoological Gardens**].—*Bull. vet. Serv., Minist. Agric., Egypt.* No. 171. pp. 10. 2 tables. [1 ref.] [In Italian: English and French summaries].

C. remarks on the frequency of TB. amongst animals in zoological gardens, not only in mammals, of which monkeys especially are affected, but also in birds and some reptiles. He concludes that liability to the disease is provoked by change of climate and the conditions of life in captivity.

Probably some infected animals are admitted, and there is always the danger of infection from attendants or visitors. He gives a list of 34 deaths from this disease in the last ten years in the zoological gardens at Cairo, and suggests certain precautionary measures, including the tuberculin test upon admission, immediate segregation of affected animals, disinfection, inspection of food supplies, heating of milk, and avoidance of overcrowding.—S. F. J. HODGMAN.

ROWLANDS, W. T., & MONTGOMERIE, R. F. (1938). **The Eradication of Tuberculosis from a Cattle-Breeding District in North Wales.**—*Vet. Rec.* **50.** 1579-1585. 2 tables. [8 refs.]

This is an account of a survey of the eradication of TB. in a breeding district in Merioneth, North Wales, 800-900 feet above sea level. The initial test was carried out on 40 small farms, with an average of 15 cattle on each farm. The incidence of TB. amongst the herds was approximately 5%. After the first test, 30 owners came into the scheme, and later the number rose to 39. At the initial test in December, 1935, 4·9% of a total of 470 animals reacted, on 30 farms. By October, 1937, this percentage was reduced to 0·52% of 572 animals on 39 farms. The reactors detected at this test were recently purchased animals.

As a result of the testing, the demand for tubercle-free cattle from the district exceeded the supply, and the prices obtained varied from £3 to £5 above the ordinary market value. The result of this experimental scheme encouraged other farmers outside the original district, in the County of Merioneth, to apply for the attestation of their herds.

From the result of the investigations it appears comparatively simple to establish clean herds in the upland areas in breeding districts where few animals are imported.—BRENNAN DEVINE.

LAJA, F. (1938). K volrosu o borjbe s tuberkulezom. [**Control of Bovine TB. in Estonia**].—*III. Balti. Valsty. vet. Kongr. Protokol. 1937.* pp. 24-33. 1 table. [In Russian].

The methods used for the control of TB. in Estonia, including arrangements for compensation of owners, are described. L. considers that the ophthalmic test is the most reliable diagnostic method, but that, owing to the difficulty in interpreting the tuberculin test, a more reliable result can be obtained by using two different tests simultaneously. In the U.S.S.R. an increase of skin thickness of 4 mm. is considered negative in intradermal tuberculin tests, one of 4-7 mm. is considered doubtful, and an increase of over 7 mm. is considered positive. In some countries a thickening of as little as 2 mm. is considered a weak positive; this divergence of views leads to considerable confusion. L. agrees with the view that the reaction should be judged not so much on the size as on the nature of the swelling, attention being paid to its sensitivity and temperature, and also to its duration.

CARPANO, M. (1936). Sulla necessità d'intensificare in Egitto la lotta contro la tubercolosi degli animali domestici. [**The Control of TB. in Domestic**

**Animals in Egypt**].—*Bull. vet. Serv., Minist. Agric., Egypt.* No. 162. pp. 12. 1 table. [In Italian].

C. discusses the general question of the spread of TB. among domestic animals with reference to economic losses and danger of infection to human beings. In Egypt the available data as to the prevalence of the disease are almost entirely confined to reports from abattoirs. Bovine TB. is exceedingly rare in Abyssinia, Eritrea, the Sudan and Cyrenaica; it is more frequent in Egypt, especially in the Delta, where the population is denser and the animals are mostly stall-fed. C. recommends sundry hygienic measures, registration of cattle, systematic tuberculin tests, and regulation of the sale of milk, and insists on the necessity of securing public co-operation by means of propaganda.—S. F. J. HODGMAN.

BLOCH, F., & COSTIL, L. (1938). Réactions de la membrane chorio-allantoïde de l'embryon de poulet aux bacilles tuberculeux bovins. [**Reactions of the Chorio-Allantoic Membrane of the Chicken Embryo to Bovine Tubercle Bacilli**].—*C. R. Soc. Biol. Paris.* **128.** 849-851. [1 ref.]

On the third day after inoculation the membrane was oedematous and thickened. Microscopically there was considerable leucocytic infiltration of the mesoderm, and perivascular histiocytic nodules containing numerous bacilli were observed. By the fifth day the bacilli were penetrating to the ectodermal surface. On the seventh day, white opaque nodules were just visible; the bacilli were very numerous and clumped together in the centre of the nodules. Similar changes were observed after the inoculation of human tubercle bacilli.—E. C. HULSE.

I. CHITI, G. (1938). Versuche einer Differenzierung der säurefesten Bakterien mittels des Agglutinationsverfahrens. Die Unterscheidung der Tuberkelbazillen des Typus gallinaceus von den Säugetiertuberkelbazillen. [**Attempts to Differentiate Acid-Fast Bacteria by Agglutination. Differentiation of Avian from Mammalian Tubercle Bacilli**].—*Zbl. Bakt. I.* (*Orig.*). **142.** 303-312. 2 tables. [13 refs.]

II. CHITI, G. (1938). Gelingt es, Tuberkelbazillen des Typus gallinaceus nach Wachstum in flüssiger Kultur von anderen Säurefesten sicher zu unterscheiden? [**Differentiation of Avian Tubercle Bacilli from other Acid-Fast Bacilli, after Growth in Liquid Medium**].—*Ibid.* 313-316. [3 refs.]

I. By means of serological absorption tests C. showed that avian tubercle bacilli were antigenically distinct from the mammalian types, and also that the avian type did not itself constitute one homogeneous antigenic group.

II. C. does not consider that the nature of growth in fluid medium constitutes a reliable criterion for distinguishing the avian from the other types of acid-fast bacilli, and states that " S " forms cannot be relied upon to behave characteristically in this respect.—E. J. PULLINGER.

GRIFFITH, A. A., & SMITH, J. (1938). **Bovine Phthisis. Its Incidence in North-East Scotland. County and City Cases.**—*Lancet.* **234.** 739-742. 2 tables. [1 ref.] [Also appeared in *Rep. med. Offr Hlth, Aberd., 1937.* pp. 1-5].

From about 1934 onwards, investigations which gradually extended to the whole of north-east Scotland were made as to the proportion of cases of pulmonary tuberculosis in man caused by the bovine type bacilli. The proportion of bovine to human type infections in 1935 was 13 : 90. The total number of cases which yielded cultures of bacilli during the whole period of the survey was 636, all but one of which were obtained from the sputum. Forty-four of these strains were typically bovine by culture and rabbit inoculation. Of the 44 bovine type cases,

13 were city inhabitants and 31 were country people, but many of the city patients had been brought up in the country or had spent holidays there.

AUBERTIN, E., RICHARD, J., & PERRINEAU, G. (1938). Ostéoarthrites fongueuses produites chez le lapin par une variété particulière, très peu virulente, de bacilles acidorésistants, après surinfection par des bacilles bovins virulents. **[Osteoarthritis Produced in Rabbits by a Variety of Acid-Fast Bacillus of Very Low Virulence, after Superinfection with Bovine Tubercle Bacilli].**—*C. R. Soc. Biol. Paris.* **127.** 1101-1104.

On subcutaneous inoculation, this strain produced a caseating lesion at the inoculation site in rabbits. By superimposing an inoculation (subcut.) of 0·0001 mg. of virulent bovine bacilli, osteoarthritic lesions were produced. In most cases lesions were observed in the intervertebral articulations; numerous acid-fast bacilli were observed, of which the cultural characteristics resembled the original strain of low virulence. As the result of the infection with the acid-fast bacillus of low virulence, the lesions produced by the bovine strain were atypical, and its virulence appeared to be greatly diminished.—E. C. HULSE.

GREENE, R., & MORGAN, H. R. (1938). **Influence of Progesterone on Experimental Tuberculosis in Male Guinea Pigs.**—*Proc. Soc. exp. Biol., N.Y.* **38.** 656-658. 1 table. [2 refs.]

As the condition of tuberculous patients has been observed to improve during the early months of pregnancy, the authors decided to investigate the possible influence of the hormone progesterone on the course of experimental TB. Male g. pigs were chosen, as the authors considered that fluctuating hormone secretion from the ovaries in females might interfere with the results. Twenty male g. pigs were inoculated subcutaneously with 1 mg. of the C3 strain of tubercle bacillus, and ten were given 0·5 unit of progesterone (subcut.) three times weekly for six weeks. The hormone did not retard the development of TB., nor did it alter the skin sensitivity to tuberculin. The authors suggest that the experiments might with advantage be repeated with female g. pigs.

RAJAGOPALAN, V. R., & GOPALAKRISHNAN, V. R. (1938). **The Occurrence of *Corynebacterium equi* in a She-Buffalo.**—*Indian J. vet. Sci.* **8.** 225-234. 1 text fig., 1 fig. on 1 plate, 2 tables. [8 refs.]

A diphtheroid organism, isolated from the vaginal discharge of a buffalo cow after abortion, showed morphological and cultural characters and biochemical reactions identical with those of *Corynebact. equi*, which is recognized as a cause of specific pneumonia in foals.

Cross-agglutination tests with the diphtheroid and a strain of *Corynebact. equi* from foal pneumonia against the homologous antisera were negative, but complement-fixation tests established the complete affinity of the two strains. Like *Corynebact. equi*, the diphtheroid was non-pathogenic for rabbits, g. pigs and mice, while it caused a fatal pyaemic pneumonia in a 14-day-old foal on nasal instillation. Intravaginal instillation of 5 c.c. of a saline emulsion of the diphtheroid, given also orally, failed to induce abortion in a cow at the ninth month of pregnancy. No lesions developed in two calves, 2-3 months old, which were swabbed intranasally with a saline emulsion in an attempt to produce pneumonia or pyaemic arthritis.
—R. O. MUIR.

WEINBERG, M., FORGEOT, P., & MERLE, A. (1938). Contribution à l'étude expérimentale du B. de Poêls, l'un des principaux agents des complications gangréneuses de la fièvre aphteuse au cours de la récente épidémie observée

en France. [**Experimental Study of** *Corynebacterium pyogenes bovis*, **an Important Agent of Gangrenous Complications in the Recent Outbreak of Foot and Mouth Disease in France**].—*Bull. Acad. vét. Fr.* **11.** 525-534. [3 refs.]

Two cows were experimentally infected with the most pathogenic of several strains of *Corynebact. pyogenes*, one by three increasing intravenous doses at intervals of 25 and 11 days, and the other by a single intramuscular dose. An acute abscess developed at the site of inoculation in the first cow with a resultant loss of condition and, after several months, paralysis of the limbs due to chronic suppurative arthritis of the fetlock and pastern joints. After slaughter, *Corynebact. pyogenes* was isolated from several organs and from an affected joint. The other cow developed a large intramuscular abscess from which the organism was recovered a month later. The abscess was reabsorbed after a course of vaccination. Neither a local nor a general reaction was produced in a healthy cow by vaccination with a small dose of anaculture. Cultures isolated later from the two cows showed no increase in virulence for g. pigs or rabbits. Calves born after infection did not exhibit immunity to an intramuscular injection of *Corynebact. pyogenes*.—R. O. M.

HAMMERSLAND, Hazel, & JONESCHILD, E. M. (1937). **Pseudotuberculosis of Deer.** —*J. Amer. vet. med. Ass.* **91.** 186-192. 1 fig. [3 refs.]

On P.M. examination of a deer, abscesses were found in the parietal and visceral pleura and in the subcutaneous tissues round the horns and parotid region. From these lesions, an organism identical with *Corynebacterium ovis* was isolated. Inoculation of g. pigs, rabbits and mice with suspensions of the organisms resulted in multiple abscess formation. Dogs and chickens were not susceptible.

Only three cases of pseudotuberculosis in deer are known to the authors.

—HUGH N. SPEARS.

PENHA, A. M. (1937). Contribuição ao estudo da peste dos " polmoes " (pyobacillose dos bezerros). [**" Peste dos Polmoes " (Skin Infection Due to** *Corynebacterium pyogenes*) **of Calves**].—*Arch. Inst. biol. Def. agric. anim., S. Paulo.* **8.** 189-196. 4 figs. on 2 plates, 2 tables. [20 refs.] [English summary].

Infection of the skin with *Corynebact. pyogenes* is described. The organism was demonstrated in unopened abscesses.—S. TORRES.

I. HART, L. (1938). **The Occurrence of Swine Erysipelas in New South Wales.** —*Aust. vet. J.* **14.** 12-15. 1 fig. [10 refs.]

II. PULLAR, E. M. (1938). **Swine Erysipelas in Victoria.**—*Ibid.* 16-22. 1 fig. [11 refs.]

I. H. describes the isolation from two pigs of an organism having the morphological, cultural and pathogenic characters of *Erysipelothrix rhusiopathiae*. One strain was isolated from a suckling in which the infection was bacteraemic or septicaemic, and the other from typical lesions of verrucose endocarditis, in an older pig on a different farm. Two other suspicious sporadic cases in N.S.W. are mentioned. These are the first recorded instances of S.E. in this State, although an organism which is culturally and serologically indistinguishable from *E.r.* commonly causes polyarthritis in young sheep.

II. The first recognized outbreak of S.E. in Victoria is described. It affected about six porkers in a small herd of Large White pigs on a wheat farm in the north west of the State. *E.r.* was isolated from one case and confirmed serologically, a detailed description of the strain being given. Sera from the rest of the herd

were tested and 15 gave complete agglutination at 1 : 100, but on retesting with higher dilutions only three were of interest (two at 1 : 160 and one at 1 : 320). The difficulty of interpreting agglutination at 1 : 100 is shown by the fact that of five apparently normal pigs kept at the laboratory, two gave partial agglutination at this titre. The two animals showing 1 : 160 and the one showing 1 : 320 were retained for observation for some three months. One with a titre of 1 : 160 maintained this level, but showed no symptoms, and at autopsy no lesions were found and no growths occurred. The other two were arthritic and their titres increased considerably. In one, joint lesions were slight on autopsy and no cultures of the organism were obtained, whereas the other showed well marked, multiple joint lesions and slight verrucose endocarditis, and the organism was recovered in pure culture from an affected joint.

Possible sources of infection are discussed. There had been no contact with other swine, nor had pork scraps or garbage been fed. The disease occurred shortly after the pigs were put in a large, bare paddock and fed on barley from a self feeder. There were sheep on the property, but no cases of arthritis had occurred amongst them. Poultry had been in the paddock, some of which had been lame, and the carcasses of those which died were eaten by the pigs. Although infection may have arisen from the poultry, it is considered on the whole more likely that it was due to infection of the barley by mice in the feed shed.—D. A. GILL.

MURNANE, D. (1938). **Arthritis in Lambs.**—*Aust. vet. J.* **14.** 23-36. [12 refs.]

While this disease sometimes affects lambs prior to castration and docking, it usually occurs as a sudden outbreak affecting a large percentage of the lambs, some 10-14 days after these operations. Both sexes and all breeds seem equally susceptible. The limb joints are most commonly affected, and since movement is painful the lambs do not feed normally, and lose condition. About 75% recover completely in 3-4 weeks, about 5% die, and the remainder are chronically affected with lameness and deformity of joints. The lesions in the joints in the acute stage are inconspicuous, but in the chronic form there is erosion of the articular surfaces, cloudy and flocculent synovia and commonly some degree of ankylosis.

The disease is due to an organism which is present in the affected joints in pure culture. While it appears to be identical with *Erysipelothrix rhusiopathiae*, and while European and American workers have also assumed it to be identical, M. points out that, while the organism of ovine arthritis is intensely pathogenic for mice, it appears to have no ill effect whatever upon pigs, even when large doses are given intravenously. He therefore considers it is more closely akin to the organism of mouse septicaemia than to *E.r.* While the evidence strongly suggests that infection usually takes place either through the castration and docking wounds or through the umbilicus, M. induced the disease in lambs with cultures of the organism given by the mouth or dropped on to the eyes. Where losses are such as to warrant it, the treatment of the navel at birth with antiseptics is advocated; marking should be carried out with due regard for cleanliness and in yards temporarily erected for the purpose. In certain instances the prophylactic use of vaccine or serum may be economical.—D. A. GILL.

BOQUET, F. (1937). Recherches expérimentales sur la pseudo-tuberculose des rongeurs. [**Pseudotuberculosis of Rodents**].—*Ann. Inst. Pasteur.* **59.** 341-381. 7 figs., 11 tables. [Numerous refs.]

A detailed account of the morphological, cultural and pathogenic properties of *Pasteurella pseudotuberculosis rodentium*, together with a description of the clinical, epidemiological and immunological features of the disease.

Considerable space is given to the subject of dissociation, and it is stated that in view of the extreme instability of the strains it would be more appropriate to speak of them as homogeneous and agglutinable in physiological saline rather than as S and R. The biochemical, pathogenic and antigenic properties of the variants are equally distinct, the homogeneous type being more pathogenic and having a more marked action on sugars. Both variants are motile at 20°C., but non-motile at 37°C. Although without flagella at 37°C. the organisms still contain flagellar antigen, but this is greater in the homogeneous strain. In both variants flagellar antigen is more abundant when grown at 20°C.

The spread of the organisms in healthy and immune animals resembles that described following infection and superinfection with *Mycobacterium tuberculosis*. With the progress of infection an allergic state develops which is revealed by local and general reactions to sterilized liquid cultures of the organism. Avirulent strains confer a specific immunity on g. pigs.—GWILYM O. DAVIES.

I. OLT, A. (1937). Ueber das seuchenhafte Auftreten der Rodentiose unter den Hasen. [*Pasteurella pseudotuberculosis* **Infection in Hares**].—*Z. InfektKr. Haustiere.* **52.** 89-107. [13 refs.]

II. MORETTI, B. (1938). Ein Beitrag zur Pseudotuberkulose. [**Pseudotuberculosis**].—*Dtsch. tierärztl. Wschr.* **46.** 35-37. 1 fig., 3 tables. [12 refs.]

I. The significance of *Past. pseudotuberculosis* infection of hares and rabbits is discussed with special reference to the question of nomenclature. The macroscopic and microscopic changes produced in hares are detailed. Control of the disease is complicated by the fact that it is also a natural infection of mice and rats, so that measures must include the extermination of these pests.

II. Six strains of *Past. pseudotuberculosis* collected from different animals (hare, rabbit, nutria, pigeon and man) were examined culturally and serologically, and from these investigations it is concluded that whilst there are no cultural differences between strains, several antigenic sub-types exist. [The serological findings should only be accepted with reserve. No attempt appears to have been made to differentiate between " H " and " O " agglutination, and it seems likely that the minor differences which were noted in the tests may have been due to the presence of varying proportions of " H " and " O " antigen and antibody in the test fluids].—E. J. PULLINGER.

HART, L. (1938). **The Occurrence of Fowl Cholera in Australia.**—*Aust. vet. J.* **14.** 71-72. [2 refs.]

The occurrence of heavy mortality due to septicaemic *Pasteurella aviseptica* infection in fowls is recorded for the first time in Australia. Particulars of five outbreaks are given. The strains isolated were highly pathogenic for rabbits and fowls, but less so for g. pigs. They were non-pathogenic for fowls by the intranasal and intraocular routes, however, or when given *per os*. Subcutaneous inoculation in fowls produced local necrosis and oedema. This type of infection was recorded by SEDDON (1914) in Australia as the cause of oedema of the wattles of poultry.—D. A. GILL.

NOBREGA, P., & REIS, J. (1937). Sobre o reconhecimento de portadores na cholera aviaria e a persistencia da " pasteurella avicida " nesses animaes. [**Fowl Cholera Carriers**].—*Arch. Inst. biol. Def. agric. anim., S. Paulo.* **8.** 183-188. 1 table. [10 refs.] [English summary].

The authors emphasize the importance of healthy carriers in the epizootology of fowl cholera. The fluorescent type of *Pasteurella avicida*, which is supposed

to disappear very soon from the body, can survive 15 months in the nasal passage of fowls. The existence of carriers of this type of pasteurella explain the periodical reappearance of epizootic fowl cholera, a feature very often met with in Brazil. These findings agree with those of HUGHES and his co-workers [(1930-32). *J. exp. med.* **51.** 225 and 239, and **55.** 71]. Inoculation into pigeons of the mucus from the nasal passage of the fowls is the best way of demonstrating the carriers. Cultural and serological work are described.—S. TORRES.

STAFSETH, N. J. (1938). **The Whole Blood Agglutination Test for Pullorum Disease.**—*Vet. Med.* **33.** 6-9. [3 refs.]

The whole-blood slide aggl. test using a stained concentrated antigen is described and S. points out a number of advantages which he thinks this test has over the tube aggl. test. He emphasizes the need for hygienic measures when controlling the disease by means of the test. The whole-blood slide aggl. test is the only one used in the state of Michigan.—L. E. HUGHES.

FRANK, N. A., & EDGINGTON, B. H. (1937). **Agglutinin Content of Eggs from Salmonella Pullorum Infected Hens.**—*Poult. Sci.* **16.** 442-444. 1 table [5 refs.]

A brief survey of the literature is given. 495 eggs from hens naturally affected with pullorum disease, as indicated by the presence of agglutinins in their blood serum, were tested for the presence of similar agglutinins in the yolk and albumen. At autopsy *S.p.* was recovered from 18 of the 19 birds from which the eggs were obtained.

The yolks of 373 eggs gave complete agglutination when tested by the stained-antigen-plate method; in all cases the albumin proved negative. Of 92 eggs cultured for the presence of *S.p.*, all were negative.—L. E. HUGHES.

BARBONI, E. (1937). Ricerche sul primo focolaio di pullorosi nei tacchini riscontrato in Italia. [**The First Cases of Pullorum Disease in Turkeys in Italy**]. —*Clin. vet., Milano.* **60.** 597-613. 4 figs., 2 tables. [Numerous refs.]

Fifteen turkeys 5-10 days old died after an illness of 3-4 days, and a type of *Salmonella pullorum* was isolated. It was found that the eggs of infected turkeys were also infected.—HANS GRAF (ZÜRICH).

I. KUJUMGIEFF, I. (1937). Saggi di differenziazione fra Bacterium pullorum (Rettger) e Bacterium gallinarum (Klein) per mezzo dell' agglutinazione aspecifica alla tripaflavina. [**Non-Specific Agglutination with Trypaflavine for the Differentiation of** *Salmonella pullorum* **and** *Salmonella gallinarum*]. —*G. Batt. Immun.* **19.** 364-370. [9 refs.] [English, French and German summaries].

II. SCARAPELLINI, M. (1938). A propos du comportement des Salmonellae Pullorum-Gallinarum dans l'agglutination aspécifique à la trypaflavine. [**Non-Specific Agglutination with Trypaflavine for the Differentiation of** *S. pullorum* **and** *S. gallinarum*].—*Boll. Sez. ital. Soc. int. Microbiol.* **10.** 44-48. 1 table. [10 refs.] [In French].

I. K. investigated whether trypaflavine would produce a non-specific agglutination reaction that could be used for differentiation between *S.g.* and *S.p.*, fixed quantities of the trypaflavine and of a suspension of 48-hour agar culture being mixed, the tubes then being corked and shaken.

All of five strains of *S.p.* were agglutinated, but there was no agglutination of 14 strains of *S.g.*; with one strain of *S.g.* there was a trace of agglutination.

Agglutination began between the 15th and 18th hour and was very evident from the 24th to the 30th hour.

II. The author endeavoured to confirm the work of KUJUMGIEFF. He found that 13 out of 25 strains of *S. pullorum* were not agglutinated and five out of 23 strains of *S. gallinarum* were agglutinated with trypaflavine.—D. L. HUGHES.

BEAUDETTE, F. R. (1938). **An Outbreak of Fowl Typhoid in Guineas.**—*J. Amer. vet. med. Ass.* **92.** 695-698. [13 refs.]

Describes an outbreak of fowl typhoid among young guinea-fowls in which there was a mortality of 92% within three weeks of onset of the disease in the flock, and in which respiratory symptoms were prominent. The chief P.M. lesions were enlargement and friability of the liver and spleen, congestion of the lungs, catarrhal enteritis and, in the nasal passages, a considerable amount of mucus from which *Salmonella gallinarum* was recovered in pure culture.

Details are given of the fermentation reactions exhibited by the recovered organism. B. discusses the literature dealing with the susceptibility of various species of domesticated and wild birds to fowl typhoid.—H. BURROW.

BRAGA, A. (1937). Sobre o isolamento de germes do grupo coli-typhico-dysenterico de ovos de chelonios da Amazonia, consumidos como alimentos. I. [**The Isolation of Bacteria of the Coli-Typhoid-Dysentery Group from Tortoise Eggs Eaten as Food in the Amazon District. I**].—*Bol. Soc. brasil. Med. vet.* **7.** 453-459. [Numerous refs.]

*Bact. coli communis*, *Bact. leporis*, *Bact. equirulis* and "*Eberthella enterica*" were isolated from tortoise eggs eaten by natives in the Amazon basin. B. considers the epidemiological importance of these findings in relation to tropical pathology. —S. TORRES.

I. KERR, W. R. (1938). **Bovine Contagious Abortion. Part I. Experiments with a New Type of Dead Vaccine.**—*Vet. Rec.* **50.** 717-726. 22 figs., 3 tables.

II. COMMON, R. H., & KERR, W. R. (1938). **Bovine Contagious Abortion. Part II. The Relationship between Plasma Proteins and Agglutination Titre.**—*Ibid.* 727-730. 2 tables. [8 refs.]

I. An attempt was made to produce a medium reminiscent of that used for the tubercle bacillus by SPAHLINGER [*V. B.* **6.** 14.]; it was hoped that such a medium would yield a bacterial growth that after suitable treatment would possess a good antigenic power. Normal uterine fluid was sterilized by filtration, sown with culture and incubated. The culture was then maintained in the incubator for 8-12 months until the organisms were dead. It was tested on male g. pigs which were vaccinated and later infected with *Brucella abortus* by instillation of the infecting dose on to the conjunctiva.

The degree of infection resulting was judged by the relative increase in size and weight of the spleen, by the development of purulent orchitis, and by the presence of abscesses in the liver. Results showed that according to the criteria laid down, the vaccine conferred a partial immunity on the g. pigs.

Further experiments were carried out on heifers with negative blood agglutination reactions. These were vaccinated and exposed to heavy natural infection from discharge of aborted cows and also from contact with infected cows. Unvaccinated control heifers were exposed to the same infection. Results showed only a partial immunity in the vaccinated group.

A low and delayed aggl. titre developed in the control animals, which subsequently aborted, while the vaccinated animals showed a prompt and definite

aggl. response to infection. This is considered to suggest that a low aggl. titre may indicate an animal potentially more dangerous than one giving a high titre. Calves of the herd born prematurely gave negative aggl. reactions at birth, but became positive after one week and remained so, on an average, for six weeks. *Br.a.* was recovered from 90% of milk samples from both vaccinated and control animals, and from uterine discharge from cows of both groups.

II. A rise in globulin and corresponding fall in albumin was noted in the blood sera of the vaccinated heifers mentioned in I. This rise was also noted when abortion occurred following massive natural infection. This may be explained as either a normal accompaniment of parturition or as arising directly from the presence of antibodies excited by *Br.a.*: the precise explanation has still to be decided. Reference is made to the technique of assessment of serum-globulin and to the albumin : globulin ratio.—H. Burrow.

Butozan, V. (1938). Početna istraživanja Bangove bolesti goveda u nekim srežovima Vrbaske banovine. [**Bovine Brucellosis in the Vrbas Province in Yugoslavia**].—*Jugoslov. vet. Glasn.* **18.** 140-143. 2 tables. [7 refs.]

B. examined 328 cows for brucellosis in the Vrbas Province of Bosnia, Yugoslavia. Blood serum agglutination tests were considered as positive at a titre of 1 : 200, and samples of whey at 1 : 40. With these criteria blood serum samples were positive in 11 cases (3·4%). Blood samples taken from 31 cows which had aborted gave positive results in 22 cases. In only one out of the 31 cases was B. able to isolate *Br. abortus*, and similarly the organism could only be isolated from one of the foetuses. [No details given].—B. Oswald (Križevci).

Holth, H. (1938). Oversikt over de diagnostike undersøkelser i anledning den smittsomme kastning, foretatt ved Veterinaerinstituttet i 1937. [**Results of Diagnostic Work on Bovine Brucellosis at the Veterinary Institute, Oslo, in 1937**].—*Norsk VetTidsskr.* **50.** 158-169. 4 tables. [English and German summaries].

During the year 1937, 32,948 blood samples from cows were tested (as against 74,477 in 1936), in the majority of cases by the agglutination test, the complement-fixation test being applied merely for confirmation, and in comparatively few cases; 1,427 (4·3%) gave positive reactions, 103 (0·3%) were doubtful, and 31,418 (95·4%) were negative. Of 1,487 samples from cows bought in the market, six reacted positively and two gave doubtful reactions. The placentas from two heifers were infected. As several herds were examined more than once, the figures quoted do not show either the actual number of cows tested or the exact number of positive reactors.

The blood samples were derived from a total of 5,005 herds (as against 7,193 in 1936) positive reactors were found in 161 and suspicious cases in three.

Of 3,361 abortions recorded in cattle, 291 (8·9%) were found to be due to brucella infection, as against 14% in 1936. The progress of the control work is considered satisfactory.

Blood samples from six horses, 211 goats, two sows, one fox and one human being were also tested, and positive reactions were obtained in five of the goats and in the human case.

A point demanding serious consideration, in H's opinion, is the fact that brucella infection in the cow may be latent for some time and that such an animal may yield a negative reaction to the aggl. test, and then eventually become a reactor.

—Gustav Naerland (Oslo).

THORSHAUG, N. (1937). La lutte contre l'avortement épizootique des bovidés en Norvège. [**Control of Bovine Contagious Abortion in Norway**].—*Bull. Off. int. Hyg. publ.* **29.** 956-962. 1 table, 1 chart.

Although efforts have been made in Norway to combat this disease for 30 years, it is only since 1934 that systematic methods have been employed to eradicate it. One of the greatest difficulties, however, is that many cattle owners have only a vague idea of the importance of this disease.

The measures which have been put into force by the State have two main objects, *viz*, to prevent spread of infection from herd to herd, and to eradicate the disease in particular herds. The latter is supported by State grants, but is optional and is only carried out in certain herds. Although these measures have only been applied for about two years, considerable improvement is noted. The disease has been eradicated from 62% of infected herds and it is expected that a further 28% will be free in a short time. Less than 10% of herds remain to be dealt with.

—GWILYM O. DAVIES.

VERŠILOVA, P., & ŠTRITER, V. (1937). Opyt izučenija immuniteta pri brucelleze u ovec s pomoščjju metoda superinfekcii. [**A Study of Resistance to Brucellosis in Sheep Subjected to Superinfection**].—*Brucellosis in Sheep.* pp. 339-349. 2 tables. Moscow: Viem Publ. Dept.

Sixty-four healthy sheep were artificially infected with a virulent strain of *Br. melitensis* ($10^5$ to $10^9$ organisms), and then given superimposed infections with the same strain at intervals of from three months to two years. It is stated that when cultures were prepared three months and also two years later, no growths occurred. The doses used for the superimposed infections were in most cases $10^6$ bacilli in the earlier experiments, and $10^5$ in the later experiments, and were 20-200 times the minimum infective dose; in control animals these doses were sufficient to establish a generalized infection of the internal organs. Bacteriological examination of sheep, which were slaughtered 15 days after superimposed infection, indicated that the primary infection tended to increase the resistance of the animals to superinfection over a period ranging from three months to two years, since in the majority of cases the brucella were either completely irrecoverable or else present only in the lymph nodes nearest the point of inoculation. In only two of the 54 sheep tested with the above-mentioned doses were the brucella found generalized throughout the internal organs.

This acquired resistance varied considerably from one animal to another, and showed a tendency to decrease in the period after the primary infection. It was also broken down by reinoculation with massive doses (of the order of 2,000 times the minimum infective dose) of the virulent strain. Nevertheless, the results were considered sufficiently encouraging to warrant a further search for a method of prophylactic vaccination.

The authors claim that in superinfection there is a method for determining whether a sheep is or has been infected; normal susceptibility would, it is said, indicate absence of previous infection, whereas heightened resistance would indicate past infection.

SANTAGOSTINO, C. (1937). Considerazioni sull'epidemiologia di alcuni casi di febbre ondulante. [**Epidemiology of Undulant Fever**].—*Clin. vet., Milano.* **60.** 139-146. [17 refs.]

S. states that since 1924, when the campaign for the control of brucella abortion in domestic animals was initiated at the Stazione Zooprofilattico di Milano, not a single case of human infection has been recorded from the use of the live vaccine

prepared there, although no less than 100,000 ampoules of the vaccine have been issued. He attributes this fact chiefly to the precautions taken to ensure that the culture used for the vaccine is derived from cattle known never to have been in contact with sheep ; *Br. melitensis* carried by the latter is highly infectious to man, but it is stated that no case of human *Br. abortus* infection has been recorded in Lombardy. S. states that in preparing the vaccine the bovine strain should not be passaged through g. pigs, owing to the possibility of these animals being already infected with *Br. melitensis*.

CORDIER, G. (1938). Effets des inoculations de certaines souches de Brucella avec ou sans excipient irrésorbables chez diverses espèces animales. [**Effect of Inoculating Certain Brucella Strains, with or without an Unabsorbable Excipient, in some Domestic Animals**].—*Rev. Méd. vét., Toulouse.* **90.** 481-503. 5 tables. [4 refs.]

The results of injections of broth cultures of an avirulent bovine strain of *Br. abortus*, both alone and suspended in vaseline-lanoline mixtures is compared in two groups of 20 g. pigs. Tables indicate size of local reaction and agglutinating titres at given intervals after injection. In no case was *Br.a.* recovered at autopsy.

Similar data and results of allergic tests with " brucellore " (a commercial preparation) are tabulated for 12 ewes injected with a vaseline-lanoline suspension and eight [? six] with broth culture. Inoculation of 200 guinea pigs with blood and milk taken at intervals from these ewes gave negative results, and none of the ewes aborted. The same results were obtained in 18 ewes and nine cows with vaseline-lanoline suspensions of the same strain of *Br.a.* and of a strain of *Br. suis*.

Repeated injections at half-yearly or yearly intervals did not affect gestation. Field strains gave results similar to those obtained with the two brucella strains.
—R. O. MUIR.

VELU, H., & ZOTTNER, G. (1938). Stérilisation des germes dans les vaccins antibrucelliques lanolinés. [**Sterilization of the Bacilli in Brucella Lanoline Vaccines**].—*C. R. Soc. Biol. Paris.* **129.** 749-751. [3 refs.]

Three bovine strains of *Br. abortus* from centrifuged 48-hour cultures growing well on ordinary media were suspended in 50%, 20% and 10% of lanoline respectively, and sub-cultured at intervals in broth and on agar during storage in the dark at room temperature. The mixtures proved sterile after eight hours, five days and 12 days respectively.—R. O. MUIR.

VALLE, A. L., BRAGA, A., & WEY, A. (1938). Epizootia mortifera em patos novos, devida a Alcaligenes Faecalis. [**Deaths in Young Ducks, Due to Infection by** *Bacterium alcaligenes*].—*Bol. Soc. brasil. Med. vet.* **8.** 15-18. [4 refs.] [French summary].

The authors describe an epizootic disease, in ducks two to three weeks old, characterized by diarrhoea, weakness and death in 24 hours. The mortality was about 100%. Older ducks were not affected. The lesions were those of a septicaemic disease. Blood culture showed a motile Gram-negative bacillus that was identified as *Bact. alcaligenes*. [The authors say nothing about any experimental reproduction of the disease].—S. TORRES.

HUBER, F. L., & KRANEVELD, F. C. (1937-1938). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indië. XXI. Vergelijkende proeven met boutvuurserum. XXII. Het voorkomen van antistoffen tegen boutvuur en paraboutvuur in het serum van normale

runderen en paarden. [**Anaerobic Diseases of Animals in the Dutch East Indies. XXI. Tests of Blackleg Serum. XXII. Antibodies against Blackleg and Malignant Oedema in the Serum of Normal Cattle and Horses**]. —*Ned.-ind. Bl. Diergeneesk.* **49.** 349-359, and **50.** 60-78. 10 tables, 2 graphs. [3 refs.] [English and German summaries].

KRANEVELD, F. C., & DJAENOEDIN, R. (1938). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indie. XXIII. De diagnostick van boutvuur. [**Anaerobic Diseases of Domestic Animals in the Dutch East Indies. XXIII. Diagnosis of Blackleg**].—*Ibid.* 115-130. 6 tables. [English and German summaries].

XXI. The duration of passive immunity after injection of blackleg serum was found to be short in guinea pigs, but was still demonstrable in sheep up to the 14th day. A serum of high potency was obtained when cattle were treated either with culture filtrate, blackleg culture or blackleg muscle powder.

XXII. In immunization experiments on g. pigs, no evidence was found of cross-immunity between *Clostridium chauvoei* and *Cl. septique*, but in cattle and horses so treated there was such cross-immunity. Blackleg serum sometimes protected against *Cl. septique* and *vice versa*. It was shown, however, that sera of normal animals had a protective action against these organisms. The experiments, therefore, only indicate the presence of a common component to a limited extent in *Cl. chauvoei* and *Cl. septique*.

XXIII. In the Dutch East Indies the best way of sending blackleg material to the laboratories was found to be in the form of dried muscle, or of fresh muscle packed in sterile salt. Examination is made by cultivation on glucose-blood agar Zeissler plates and by direct inoculation of g. pigs. In the case of a negative result it is advisable to inoculate g. pigs with liver-broth culture. The g. pig inoculations give better results than the cultural tests. Of the cultural methods, direct cultivation on Zeissler plates is the quickest and the most reliable.

—JAC. JANSEN (UTRECHT).

MCCOY, Elizabeth, & MCCLUNG, L. S. (1938). **Serological Relations among Spore-Forming Anaerobic Bacteria.**—*Bact. Revs.* **2.** 47-97. [Num. refs.]

A comprehensive review of the efforts which have been made to classify the *Clostridium* genus serologically, the discussion being confined to the value of results rather than to any consideration of the technical methods applied. Whilst the genus as a whole cannot be classified serologically, these methods serve to sub-divide closely related types, and thus the toxin-antitoxin differentiation of *Cl. chauvoei* and *Cl. septique*, or of the types of *Cl. welchii*, is of unquestionable value. All attempts to classify *Cl.w.* by agglutination have failed, and the subdivision of strains of *Cl. tetani* according to " H " antigen seems to serve no useful purpose ; on the other hand the " O " antigen of *Cl.t.* may have taxonomic significance, whilst " O " antigen also serves to relate *botulinus* and *parabotulinus* strains.—E. J. PULLINGER.

MILOVZOROV, E. P., & TCHASOVNIKOV, N. (1933). Opyty immunizacii pru infekcionnom mastite ovec. [**Immunization Experiments in Connexion with Infectious Mastitis of Sheep**].—*Sovyet. Vet.* No. 11. pp. 34-37. 1 table.

Two series of experiments were conducted on the immunizing effect of formalin-killed vaccines against " *B. mastitis ovis* ". Nine sheep were given two

subcutaneous doses, at eight days' interval, of formalin-killed agar culture suspension ($5 \times 10^9$ organisms for the first, and $10^{10}$ for the second dose). They were infected [method not stated] a month later, together with two unvaccinated controls. In the latter acute mastitis developed, with subsequent loss of function of the infected half of the udder, whereas in the vaccinated animals only oedema was produced, which disappeared in 4-5 days. A similar small scale experiment was repeated the following year, with comparable results.

Vaccination as a prophylactic measure was then studied under natural conditions on 4,197 sheep. Mastitis after lambing had been fairly widespread and serious in the flocks in previous years, and had already appeared before vaccination commenced. The vaccine used was prepared from broth cultures of four strains freshly obtained from the farm. They were incubated for 48 hours and killed with 0·13% formalin (24 hours in incubator).

Three vaccinations were performed at 8-10 days' interval with 2 c.c., 3 c.c. and 4 c.c. respectively.

It was not possible to keep controls, but the authors considered the results to be significant in comparison with the incidence and virulence of the disease in the same flocks before vaccination.

KLIENEBERGER, Emmy. (1938). **Pleuropneumonia-Like Organisms of Diverse Provenance: Some Results of an Enquiry into Methods of Differentiation.** —*J. Hyg., Camb.* **38.** 458-476. 8 text figs., 14 figs. on 2 plates, 7 tables. [19 refs.]

A number of pleuro-pneumonia-like organisms were studied in respect of cultural and serological reactions with a view to their classification. In addition to the organisms of contagious bovine pleuro-pneumonia and contagious agalactia, strains were isolated from cultures of *Streptobacillus moniliformis* from lung lesions in rats and from the lungs of dogs stated to be affected with distemper. By comparing morphological appearances, average colony size and structure, and the appearance of "granular" and coarse" colonies after three days incubation on solid medium, a preliminary grouping was achieved.

The serological differences were detected by preparing agglutinating sera in rabbits. The results of cross-agglutination tests showed that the 16 strains examined fell into 7 distinct sub-groups. Thus, the organisms occurring in symbiosis with *Str.m.* represented one group, the pleuro-pneumonia strains fell into a second, and so on. The organisms isolated from the lung lesions in rats were pathogenic for mice.

Details of the experiments should be consulted in the original by those interested.—R. E. GLOVER.

AJELLO, P. (1937). Ricerche batteriologiche sull'utero della cagna. [**Bacteriological Tests on the Uteri of Bitches**].—*Clin. vet., Milano.* **60.** 614-626. 1 table. [Numerous refs.]

A. gives details of the examination of the uteri removed surgically from 52 bitches, and tabulates the results. The animals were not in whelp, and 46 of the uteri appeared quite normal on macroscopic inspection. In 37 cases the contents of the uterus were sterile, and in 15 cases bacteria were present. *Brucella melitensis* was isolated from one. In the majority of cases the bacteria discovered were scanty and of little or no pathogenicity. He discusses the importance of the non-pathogenic bacteria found and suggests that in certain circumstances they might become pathogenic. He also discusses the path of entry into the uterus and suggests that the organisms were introduced at coitus.—S. F. J. HODGMAN.

LANGERON, M., & GUERRA, P. (1938). Nouvelles recherches de zymologie médicale. [**Medical Mycology**].—*Ann. Parasit. hum. comp.* **16.** 36-84 and 162-179. 1 table. [Numerous refs.]

The authors criticize the confusing nomenclature adopted for the lowest fungi —the yeasts and pseudo-yeasts—and claim that the 200 pathogenic fungi included in the genera *Monilia*, *Cryptococcus*, *Saccharomyces*, *Endomyces* and *Debaromyces*, could be reduced to about 20 valid species. After detailing cultural methods for isolation and purification, they describe the principal growth characters on solid and in liquid media. Microscopic technique and fermentation tests are given, with a critical examination of their value. A synthetic medium is described with ethyl alcohol as the sole source of carbon. Sugar fermentation and nitrogen assimilation are next considered, with a description of the auxanographic method of study. The authors have applied these methods of study in classifying the Mycotoruloideae parasitic in man and animals.

The genus *Parendomyces*, diagnosed by its characteristic chlamydospores, corresponds with *Candida albicans*, the name in their new classification. The type species and several others of the genus *Castellania* are classified by sugar fermentation as either *Candida tropicalis* or *Candida guilliermondi*. Several species of the genus *Parasaccharomyces* automatically fall into four species of *Candida*. The genera *Syringospora*, *Blastodendrion*, *Mycotoruloides*, *Mycocandida*, *Pseudomonilia*, *Schizoblastosporion* and *Pseudomycoderma* are distributed amongst nine species of *Candida*.

The Mycotoruloideae are defined as anascosporous pseudo-yeasts (as opposed to the ascosporous yeasts), which are habitual parasites of mammals, characterized by a pseudomycelium of blastospores with an imperfect type of sporulation. They are united in a single genus, *Candida*, which is divided into 17 species according to carbohydrate fermentation.—R. O. MUIR.

MUENDE, I., & WEBB, P. (1937). **Ringworm Fungus Growing as a Saprophyte under Natural Conditions.**—*Arch. Derm., Chicago.* **36.** 987-990. 2 figs. [Copied *verbatim* from *Rev. appl. Mycol.* **17.** 245].

In April, 1936, the writers visited a farm near Oxford, England, to investigate a severe outbreak of ringworm among calves kept in stone-walled sheds with wooden partitions and feeding-troughs. Cultures obtained from the hair and scales of the animals were identified as *T. gypseum asteroides* [*T. mentagrophytes*]. Three months later a comprehensive collection of fungi was made in the same sheds, and one of the 47 specimens collected was identical with that obtained from the calves. Experimental inoculations showed it to be pathogenic to g. pigs. Fourteen healthy calves confined in the sheds during the following October also contracted the disease. This is believed to be the first record of a ringworm fungus growing as a saprophyte in nature.

## DISEASES CAUSED BY PROTOZOAN PARASITES

HOARE, C. A. (1938). **Morphological and Taxonomic Studies on Mammalian Trypanosomes. V. The Diagnostic Value of the Kinetoplast.**—*Trans. R. Soc. trop. Med. Hyg.* **32.** 333-342. 12 figs., 1 table. [11 refs.] [See also *V. B.* **9.** 12].

The term " kinetoplast " in this paper is used to denote the kinetonucleus or parabasal body alone, and not the complex of this organ and the blepharoplast. It is pointed out that the kinetoplastic characters alone afford no criteria for the

diagnosis of species, but they have a supplementary value for the differentiation of certain groups, particularly when a diagnosis has to be made on examination of a small number of organisms in a poorly stained smear.

Specimens of 14 different species of trypanosomes were examined and the kinetoplastic characters classified in respect of size, shape and position. In regard to shape, it is pointed out that the kinetoplast may appear as round, oval or rod-shaped, but these variations may largely depend on the aspect which is viewed microscopically, though it seems that the aspect which is usually seen may depend to some extent on the species. The various positions of the kinetoplast are described as terminal, subterminal, marginal and subcentral, this last implying that the organ is situated near, and posterior to, the nucleus.

In the *lewisi* group, the kinetoplast is large (1-1·4$\mu$), rounded, and subterminal or subcentral, except in *Tryp. melophagium* in which it is oval or rod-shaped and subcentral.

In the *vivax* group, it is large (1·1$\mu$), always rounded, terminal or subterminal, and occasionally marginal. In the *congolense* group, it is of medium size (0·7 to 0·8$\mu$), rounded or rod-shaped, and in the great majority of individuals subterminal and marginal. In the *brucei* and *evansi* groups it is small (0·6$\mu$), usually rod-shaped, in the majority of cases subterminal, and occasionally marginal.

Discussing Jacono's modification of Chalmer's system of classification based on the position of the kinetoplast, H. points out that *Tryp. melophagium* would be placed in the genus *Trypanosoma*, owing to its subcentral kinetoplast, whilst the majority of the *Tryp. lewisi* group would be placed in the genus *Castellanella*, although *Tryp. melophagium* possesses all the other characteristics—morphological and biological—of the *lewisi* group.—U. F. Richardson.

I. van Hoof, L., Henrard, C., & Peel, E. (1937). Action de repas médicamenteux sur l'évolution des trypanosomes pathogènes chez la " Glossina palpalis ". [**The Action of a Medicated Feed on the Development of Pathogenic Trypanosomes in** *G.p.*]—*Ann. Soc. belge Méd. trop.* **17.** 385-440. Numerous tables. [Numerous refs.]

II. van Hoof, L., Henrard, C., & Peel, E. (1937). L'infection proventriculaire permet-elle de pronostiquer à coup sûr l'invasion ultérieure des glandes salivaires de " Glossina palpalis " par " *Trypanosoma gambiense* " ? [**Is Proventricular Infection of** *G.p.* **with** *Tryp. gambiense* **always Followed by Infection of the Salivary Glands ?**]—*Ibid.* 441-459. 1 table. [12 refs.]

I. Tsetse flies infected with *Tryp. gambiense* were allowed to feed on animals treated with tryparsamide, germanin, neosalvarsan and Bayer 411 (an antimony compound) at a time when the drugs would be exerting their greatest trypanocidal action in the blood (*e.g.*, in the case of tryparsamide eight hours after injection). In the case of *Tryp. gambiense* this medication of the feed appeared to have no action on the trypanosomes in the fly in either the gut, the proventriculus or the salivary glands.

Some flies, however, in which living trypanosomes were found in the salivary glands on dissection had failed to infect animals by their bite. When infection by the bite was produced there was no prolongation of the incubation period. A preliminary feed on blood from an animal treated with any of the drugs failed to prevent the infection of flies at later feeds. Feeds of medicated blood given repeatedly during the period of development of trypanosomes in the flies failed to prevent the flies from becoming infective in all cases, but appeared to reduce the number of flies in which trypanosomes developed.

The results with *Tryp. brucei* were similar to those with *Tryp. gambiense*,

but none of the drugs appeared to have any influence on the development of *Tryp. congolense*. In the case of *Tryp. vivax*, germanin appeared to have both a disinfectant and inhibitory action, the infection percentage in tsetse which had been fed, after infection, on the blood of treated animals being half that of flies which had been fed, after infection, on healthy animals.

II. Working with a non-transmissible strain of *Tryp. gambiense*, a feebly transmissible strain, and a readily transmissible strain, the authors detected a few proventricular infections in *G.p.* but no salivary gland infections with the first, numerous proventricular infections but few salivary infections with the second, and relatively numerous infections of both sites with the third. Discussing whether salivary gland infection may occur direct, they point out that gut and proventricular infections may be very scanty, and may even die out, and thus be overlooked. They also point out that if direct gland infection occurred, the time required for cyclical development in *G.p.* should be shorter, as it is in the case of *Tryp. vivax*. Discussing whether proventricular infection is an essential step to invasion of the salivary glands, they point out that the long trypanosome forms which are believed to be responsible for the anterior migration do occur in the gut and may be able to migrate from there to the salivary glands. They consider, however, that proventricular development is a normal stage in glandular invasion even if it is not essential.—U. F. Richardson.

van Hoof, L., Henrard, C., & Peel, L. (1937). Influence de repas préliminaires indifférents sur l'évolution de *Trypanosoma cazalboui* chez *Glossina palpalis*. **[Influence of Preliminary Feeds on the Development of** *Tryp. vivax* (*cazalboui*) **in** *G.p.*]—*C. R. Soc. Biol. Paris.* **126.** 1249-1252. [4 refs.]

Two hundred *G.p.* were allowed to feed on a goat. *Tryp. vivax* (*cazalboui*) and *Tryp. congolense* appeared in the blood 14 days later and the goat died of the mixed infection 23 days after the first infection. Three lots of newly hatched flies were allowed to feed on a hen, a monkey and a g. pig (all uninfected) and then twice on the infected goat. Two other lots which served as controls were fed on the goat only. After each feed the flies were examined one by one and those which were not obviously engorged were no longer used. Of the glossina dissected and examined 28 days after feeding on the goat, 48·9% were infected with *Tryp. vivax*, and 45·8% of the controls were infected. It is concluded that a preliminary blood meal on a non-infected host has no influence on the development of infection when the flies have a subsequent feed on an infected host.

Slatineau, A., Balmus, G., & Balmus, P. (1937). Sur une épizootie due au trypanosome Lewisi-Kent. [**An Epizootic of** *Tryp. lewisi* **Infection**].—*Arch. roum. Path. exp. Microbiol.* **10.** 159-170. 6 figs., on 6 plates. [Numerous refs.] [In French].

*Tryp. lewisi*, recorded by many workers as a saprophyte of rats, has nevertheless been proved on certain occasions to have been responsible for sudden epizootics, with a high mortality among laboratory rats. After one of these outbreaks, in which only certain cages were affected, the authors experimented with four naturally infected white rats and two others artificially infected with blood from these four. All the rats died, four out of the six with marked anaemia. Macroscopical and microscopical lesions of the liver, spleen, kidneys, lungs and central nervous system are described in detail.

In the epizootic the parasite had evidently been transmitted by fleas from sewer rats in the laboratory, in which animals it was avirulent; the white rats, however, were apparently less resistant.

EULER. (1937). Die Auswirkungen und Bekämpfung der Geschlechtstrichomonaden in einer grossen ostpreussichen Rinderherde. [**The Control of Bovine Trichomoniasis in East Prussia**].—*Z. InfektKr. Haustiere.* **51.** 203-214. 2 tables, 2 graphs. [8 refs.]

A description of an outbreak of trichomoniasis in a herd of about 160 cattle in East Prussia. In 1936, 22% of pregnancies ended in abortion, but after uterine irrigation with an aqueous solution of iodine the infection was almost completely eradicated in 1937. Various other treatments were also used, but were dropped in favour of iodine.

Tests for brucellosis were mostly negative in the animals concerned.—J. E.

STABLER, R. M. (1938). **The Similarity between the Flagellate of Turkey Trichomoniasis and T. Columbae in the Pigeon.**—*J. Amer. vet. med. Ass.* **93.** 33-34. 1 fig. [2 refs.]

S. passed *Tr.c.* to a turkey by smearing its mouth with material from an affected pigeon, without causing apparent illness. A week later, cultures were made from this turkey and passaged to another turkey, which became very ill for two weeks and yielded cultures which were fed to a healthy pigeon and caused disease identical with that in the first pigeon. The turkeys remained infected for 61 and 54 days respectively.

S. considers that *Tr. diversa*, previously reported as the cause of trichomoniasis of the crop of turkeys, is synonymous with *Tr. columbae.* The drawing of the parasites isolated from these two hosts supports this conclusion.—C. V. WATKINS.

VINATZER, J. (1938). Zur Züchtung der Rindertrichomonaden in sterilisierbaren Nährmedien. [**Culture of Bovine Trichomonads on Sterilizable Media**]. —*Wien. tierärztl. Mschr.* **25.** 543-544.

V. obtained good growth of bovine trichomonads in broth containing small pieces (of the size of a pea) of the following bovine organs or tissues, and autoclaved on three consecutive days :– mucous membrane of the mouth and oesophagus, parotid gland, tracheal cartilage, tendon, bone-marrow, adipose tissue, preputial mucous membrane, corpus luteum, or pieces of blood clot. Good results were also obtained by the inclusion in the broth of hen egg yolk. The addition of 1 drop of defibrinated bovine blood to 5 c.c. broth gave better growth of the trichomonads than did larger amounts.

BARRETTO, J. F., & DE ALMEIDA, J. L. (1937). Primeiras observaçoes sobre a presença de Isospora felis Wenyon, 1923 (Protozoa – Eimeridia) em felideos no Brasil. [**The First Observation of *I.f.* in Cats in Brazil**].—*Bol. Soc. brazil. Med. vet.* **7.** 357-360. 3 figs. [17 refs.]

Two cases of *I.f.* infection were observed in domestic cats in Brazil ; the same organism was also isolated from the faeces of *Felis onça* L.—S. TORRES.

RAY, J. D. (1937). **Swine Balantidiasis.**—*Vet. Med.* **32.** 392-396. 1 photograph. [19 refs.]

A general account of the condition.—HUGH N. SPEARS.

HEWITT, R. (1938). **The Cultivation of *Plasmodium cathemerium* for One Asexual Generation on Inspissated Egg and Rabbit Serum.**—*Amer. J. Hyg.* **27.** 341-344. [8 refs.]

Tubes of slanted inspissated egg covered with 0·9% saline containing 0·5% dextrose and 5% rabbit serum were inoculated with 4-5 drops of blood from a

canary heavily infected with *Pl.c.* The tubes were inoculated in a sloping position at 37°C. Schizogony took place in about 36 hours in culture as compared with 14 hours in the living control birds.—J. E. WILSON.

I. SABIN, A. B., & OLITSKY, P. K. (1937). **Toxoplasma and Obligate Intracellular Parasitism.**—*Science.* **85.** 336-338. [2 refs.]

II. ANON. (1937). **Toxoplasma and Problems of Immunity.**—*Brit. med. J.* August 14th. 326-327. [10 refs.]

I. The authors accidentally isolated toxoplasms from two experimental mice. They showed that multiplication was only possible in the presence of living susceptible tissue ; the organisms were cultivated on Li-Rivers medium and during the course of the work they increased in virulence. Details of the experimental infection in mice, g. pigs, rabbits and rhesus monkeys are given ; in all except the last the infection was fatal. Toxoplasms appear to have characteristics common to other obligate cellular parasites such as the viruses.

Rhesus monkeys recovered from toxoplasm infection were immune to reinoculation, and their serum contained neutralizing or protective antibodies. It was found possible to titrate such sera by means of intradermal tests on rabbits. Serum from recovered rhesus monkeys, when mixed with virulent toxoplasms, protected mice and rabbits, but when the toxoplasms present were washed free of serum they retained their infectivity ; the serum appeared to have no effect on the toxoplasms *in vitro.*

Before the change in virulence, rabbits recovered from an infection given intradermally, and such recovered rabbits possessed a solid immunity although having no demonstrable circulating antibodies. The authors assume that these animals had acquired a tissue immunity to the toxoplasms.

II. Toxoplasms are parasites of experimental animals encountered as complications in transmission experiments. There are occasional reports that these organisms cause disease in man. They are small, oval, nucleated intracellular parasites, protozoan in type. Their occurrence has been recorded in many species of birds, and in the rabbit and the African gandi, in addition to laboratory animals. Commenting on the work and conclusions of SABIN [*V. B.* **5.** 683.] and of SABIN and OLITSKY [in I, above] that immunity to infections caused by obligate cellular parasites such as the viruses and toxoplasms is in the nature of a tissue resistance, and that the mechanism of such an immunity differs fundamentally from immunity to bacterial infections, it is suggested that failure to demonstrate circulating neutralizing antibodies is not sufficient evidence for assuming a tissue immunity. Failure to demonstrate a union of virus and neutralizing antibody may be due to an incorrect proportion of antigen and antibody.—L. E. HUGHES.

PITTALUGA, G. (1938). Les infections à " Bartonella ". [**Bartonella Infections**]. —*Bull. Inst. Pasteur.* **36.** 961-979. 1 table. [Numerous refs.]

P. discusses the species of *Bartonella* and considers that *B. bacilliformis* of man, *B. muris*, *B. canis* and *B. bovis* should be recognized. The human and canine species show marked pleomorphism. He also discusses the relationship of the *Bartonella* with *Anaplasma*, *Eperythrozoon* and *Rickettsia*, and the association of the different organisms in the same host. Filtration of bartonella has never been accomplished. For cultivation Noguchi's medium for leptospira is recommended, the optimum temperature being 25°-28°C.

In animals and human beings bartonella infections are characterized by anaemia and internal haemorrhages. Recovery leads to an immunity in which it appears that the parasites persist, and the immunity may be overcome by splenectomy,

though no relapse occurs when splenectomy is done on monkeys recovered from infection with *B. bacilliformis.* Infection with the causal organisms of other conditions, such as trypanosomes, salmonella or leptospira will also lead to relapse. The human infection appears to be transmitted by *Phlebotomus*, and the animal infections by lice of the genus *Haematopinus.*—U. F. RICHARDSON.

DELPY, L., & RAFIZA, A. (1938). Sur la morphologie, l'évolution et la différenciation d'*Eperythrozoon Wenyoni* (*Adler, 1934*). [**Morphology, Development and Identification of** *E.w.*].—*Bull. Acad. vét. Fr.* **11.** 203-208.

The authors studied the development of *E.w.* in experimentally and naturally infected cattle both before and after splenectomy. The infection may be observed in two forms, " epicorpuscular annular " and " plasmatic filamentous " forms. The annular type develops on the red corpuscles in the form of either rings or rackets, and is coloured a pale violet by Giemsa's stain. Multiplication from the annular type is in ring form and is apparently by division into two. The organisms also multiply, though less actively, in the plasma. The filamentous or plasma form arises from the preliminary annular types and, in dividing, one or more thickenings are observed. These extend into threads until a great variety of shapes occur. Secondary thickenings appear on the filaments, and become rings which themselves give rise to further filaments. These forms may adhere to the red corpuscles. Theileria, anaplasms, eperythrozoon and bartonella are often observed in the same blood film. The bartonella stain a reddish violet in contrast to the pale violet of eperythrozoon. Certain stages of the latter may resemble anaplasms and it may be differentiated from them by its disappearance from the blood after an injection of zothelone, the anaplasms remaining unaffected. [Figures mentioned in the text are omitted, and thus much of the value of the paper is lost].—S. J. G.

DE KOCK, G. (1937). Theileriose des Rindes und Affenmalaria. Vergleichende Untersuchungen mit besonderer Berücksichtigung des lymphatischen Systems. (Vorläufige Mitteilung). [**A Comparison of Theileriasis of Cattle and Monkey Malaria with Particular Reference to the Lymphatic System**]. —*Arch. Schiffs- u. Tropenhyg.* **41.** 581-593. 2 figs., 1 table. [Num. refs.]

The author compared the alterations produced in the lymphatic system of cattle by *Theileria mutans* with those occurring in monkey malaria as seen in material supplied by the Institute for Tropical Diseases, Hamburg. He gives a brief account of the position in South Africa with regard to theilerial infections of cattle, and sketches the recently obtained evidence that in certain circumstances *Th.m.* may cause a serious disease of cattle indistinguishable from that caused by *Th. parva.* He discusses the histological structure of lymph nodes and the lymph follicles of the spleen in affected animals, and the relationship between the cells of the reticulum and the various types of lymphocytes.

In both monkey malaria and theilerial infections of cattle the lymph follicles of the spleen showed considerable variation in size, but in many instances the size was reduced in the case of both the follicles and the secondary follicles, and in some instances the latter might be absent. The limitation of the follicles became irregular and they might be described as " fraying out " into the pulp. In the centres of the follicles phagocytosis was not observed, and the extent of mitosis was variable, the amount of reticulum being considerable and the lymphatic cells scanty. In the peripheral zone the medium-sized lymphocytes predominated, mitosis was common and macrophages occurred. The most marked change was the appearance of a homogeneous material, which was scanty in early cases of theilerial infection and in monkey malaria, but which in advanced cases of *Th.m.*

infection occupied the whole centre of the follicle and led to its destruction. The appearance of this substance was associated with degeneration of the reticulum cells. In early theilerial infections the schizonts of the parasites invaded the medium-sized lymphocytes, but in advanced cases medium and small lymphocytes were scanty and the lymphoblasts were invaded. The changes in lymph nodes were similar to those of the spleen follicles and occurred in both diseases. Accumulation of lymphatic cells occurred in the capillaries of the liver in both diseases, but similar accumulations in the kidneys only occurred in the theilerial infection.

The author discusses the function of lymphatic follicles and reviews the evidence suggesting that the secondary follicles may be the centre of the defence mechanism against toxins.—U. F. RICHARDSON.

TANGUY, Y. (1937). La piroplasmose du singe. [**Piroplasmosis in the Monkey**]. —*Ann. Inst. Pasteur.* **59.** 610-623. 33 figs. [7 refs.]

Piroplasms were found in the blood of a splenectomized *Cynocephalus* monkey inoculated with *Plasmodium knowlesi.* Pear-shaped, amoeboid, round and elliptical forms were all observed. Apart from the amoeboid forms, the largest dimensions of the parasites was rarely more than the radius of the red corpuscle. In nearly every case multiplication took place by division into two. Inoculation into monkeys of the species *C. papio*, *Silenus irus*, and *Cercopithecus callitrix* easily conveyed the disease, but in *Pan satyrus verus* (chimpanzee) transmission was difficult or was found to be positive only after splenectomy. The average incubation period was seven days. Symptoms are described and were chiefly concerned with the anaemia which followed the preliminary acute piroplasmosis. The disease is more severe in splenectomized animals. Resistance to the disease was diminished in animals in poor condition and the piroplasm was more virulent when inoculated from monkeys severely affected with anaemia. Stovarsol had no curative effect, but trypanblue and gonacrine caused rapid improvement. Inoculation experiments were performed on g. pigs, dogs and human beings, but were without results.
—S. J. GILBERT.

BRUMPT, E. (1938). Identification des piroplasmes du chien du type *Piroplasma canis.* Transmission de la souche française par la tique sud-africaine *Haemaphysalis leachi.* Faible valeur des épreuves d'immunité croisée dans les piroplasmoses. [**Piroplasms of Dogs of the Type** *Babesia canis.* **Transmission of the French Strain by the South African Tick** *H.l.* **Value of Cross-Immunity Tests in Piroplasmosis**].—*Ann. Parasit. hum. comp.* **16.** 97-116. [Numerous refs.]

*B.c.* is known to be transmitted under natural conditions by *H.l.*, *Rhipicephalus sanguineus* and *Dermacentor reticulatus*, and experimentally by *D. andersoni.* A dog which had passed through infections with strains from Morocco and France transmitted by *Rh.s.* and *D.r.* succumbed to infection with a strain of South African origin transmitted by *H.l.* The South African piroplasm maintained in dogs could not be transmitted in an experiment with *Rh.s.*, and this tick failed in other experiments to transmit the strain of French origin. Infection was, however, set up with *H.l.* and the French strain and infected nymphs transmitted the disease as adults. It was incidentally observed that *B. gibsoni* was not transmitted in the same conditions. Adult daughter ticks originating from *H.l.* females which had been fed on a dog infected with *B.c.* of French origin did not transmit infection. Infected larvae of *D.r.* did not transmit infection either in the nymph or adult stage, nor did adults which had been infected as nymphs. From tests of cross-immunity by blood inoculation, and also by natural infection with normal vectors,

it appears that strains of canine piroplasmosis possess different antigenic properties even though morphologically alike and transmitted by the same vectors. Piroplasms of the dog behave differently from piroplasms and anaplasms of cattle, in which a strong polyvalent immunity follows artificial or natural infection.

—S. J. GILBERT.

DSCHUNKOWSKY, E. (1938). Besondere anaplasmatische Formen in den Blutkörperchen der Schafe und Rinder, nebst Beschreibung eines neuen Genus Pirochroma. [**Peculiar Anaplasma Bodies in the Blood Corpuscles of Sheep and Cattle Described as a New Genus,** *Pirochroma*].—*Zbl. Bakt. I.* (*Orig.*). **142.** 86-89. 24 figs. on 1 plate. [4 refs.]

D. discusses the nature of anaplasms, and points out that chromatin granules in the red corpuscles may be remnants of the nuclear material of the cell, or they may be transmissible parasites—minute forms of *Babesia* or *Theileria* or true *Anaplasma* as described by THEILER. In reinvestigating a disease of sheep on the Dalmatian coast, he found that *B. motasi*, *B. ovis*, and *Th. sergenti* were involved ; inclusion bodies also occurred, however, in the red blood corpuscles; they resembled anaplasms in that they showed no trace of cytoplasm, but differed in that they were irregular in size and commonly appeared as pear-shaped forms. Four individuals might occur in one cell. Infection of sheep caused high fever and sometimes haemoglobinuria. Similar inclusions were encountered in cattle blood in the valley of the Save.

D. considers that the difference in morphology prevents the inclusion of these parasites in the genus *Anaplasma*, and that as they contain no cytoplasm, they cannot be included in the genera *Babesia* or *Theileria* ; he proposes, therefore, to create a new genus, *Pirochroma*, and to call the species of the sheep *P. inchiostrii*, and that of cattle *P. mayeri*. [No information is given as to whether these inclusions could be transmitted by blood inoculation].—U. F. R.

DONATIEN, A., & LESTOQUARD, F. (1938). Du cycle évolutif de quelques *Rickettsia*. [**Development Cycle of Rickettsia**].—*Bull. Soc. Path. exot.* **31.** 593-599. 3 figs. [3 refs.]

The authors record that in all rickettsial infections under study (*R. conjunctivae*, *R. canis*, *R. bovis*, *R. ovina*, *R. ruminantium* and *R. conori*) they were able to detect large inclusion bodies, which varied in colour from red to almost black when stained with May-Grünewald-Giemsa, in the cells infected by the various organisms. These inclusion bodies occur as large masses, and commonly indent the nucleus of the affected cell. At a later stage of the infections the massive inclusions become granular, and break up into coccus, ring and bacillary forms which stain lilac and are characteristic of rickettsial infection. In addition, in all the conditions under review, forms larger than rickettsial bodies were encountered, varying from $0{\cdot}5\mu$ to $3\mu$ in diameter, apparently produced by the breaking up of the large inclusion bodies. These forms stained red to purple according to the species concerned. It is claimed that, in all these infections, stages of development occur similar to those described by BEDSON and others in psittacosis [*V. B.* **3.** 361, and **5.** 561.], and by MIGAYAWA in human inguinal lymphogranulomatosis. It is suggested that the large inclusion masses might be called " initial bodies ", and the minute rickettsia forms " elementary bodies ", whilst the intermediate forms which vary considerably in their morphology may represent the transmissible stage of the organisms. It is argued that, as all *Rickettsia* so closely resemble each other in their development cycle, they should all be retained in a single genus.—U. F. R.

ROSSI, S., & DETROYAT, C. (1938). Existence en France de *Rickettsia conjunctivae* du boeuf. [*R.c.* **in Cattle in France**].—*Bull. Soc. Path. exot.* **31.** 788-790. [7 refs.]

The authors record the detection, in various districts of France, of a conjunctivitis of cattle due to an invasion of the epithelial cells of the conjunctiva by *R.c.* The various stages of development of *R.c.* as described by DONATIEN and LESTOQUARD [*V. B.* **7.** 525.] could be demonstrated easily. The disease was benign, usually ending in complete recovery, but the parasitic infection was shown to persist for some time. No treatment of any specific value was discovered. —U. F. RICHARDSON.

MEYER, K. F., EDDIE, B., & ANDERSON-STEWART, B. (1938). **Canine, Murine and Human Leptospirosis in California.**—*Proc. Soc. exp. Biol., N.Y.* **38.** 17-19. [6 refs.]

A highly fatal disease of dogs, observed in San Francisco, was proved to be due to *L. canicola.* Icteric and haemorrhagic types were recorded, the latter type greatly resembling Stuttgart disease. Chronic nephritis frequently follows infection, and, contrary to the disease as observed in Holland, the Californian type is complicated by icterus. The disease may be contracted by man and is considered widely distributed.

*L. icterohaemorrhagiae* was demonstrated in rats, but not *L.c.*; the only reservoir of the latter was the dog, but it may also set up aberrant infections in man. The rat can transmit *L.i.* to both man and dog, but the transmission of this organism from dog to dog has not yet been demonstrated in the U.S.A.—H. N. S.

## DISEASES CAUSED BY VIRUSES

HINDLE, E. (1938). **Filterable Viruses, with Special Reference to Immunity.**—*Vet. Rec.* **50.** 1354-1360. Discussion pp. 1360-1366. [11 refs.]

H. has given a useful general summary of the present position regarding the virus diseases, which should be read in the original. Arguments are advanced in favour of the particulate nature and specific size of viruses obtained by ultrafiltration analysis, ultramicroscopy and high-speed centrifugation. The maintenance of antigenic individuality, irrespective of the animal species which a given virus infects, is stressed as affording a reasonable explanation that these agents are independent living beings. Mutations in viruses, *e.g.* a change from a viscerotropic to a neurotropic character, are described in some detail, and the various methods of inducing immunity are surveyed. The significance of the isolation of crystalline protein from certain plant viruses is briefly considered.

In the discussion which followed DALLING referred to the variations in the ability of viruses to resist external influences, and indicated the conditions which favour their preservation. He mentioned the importance of the adaptation of viruses to different animals and to the changes in virulence due to passage, *e.g.* the modification of distemper virus in the ferret and the immunization of the fowl with pigeon pox. He considered that secondary organisms found in certain virus infections became enhanced in virulence as a result of passage. The nature of a virus differing from distemper which had been recovered from the brains of foxes was discussed.

DUNKIN stressed the importance of a high virus content of tissues in order to obtain the best results from artificial immunization. He was not entirely in agreement

with DALLING in regard to the role of secondary invaders, and considered that a solid immunity against distemper virus protected against bacterial organisms.
—R. E. GLOVER.

I. ROEMMELE, O. (1938). Maul- und Klauenseuche-Infektion bei in freier Wildbahn lebendem Muffelwild. [**Foot and Mouth Disease in Wild Mouflons**].—*Berl. Münch. tierärztl. Wschr.* Sept. 23rd. 577.

II. WOLF, J. (1938). Die Bedeutung weniger- und nichtempfänglicher Tierarten für die Epizootologie der Maul- und Klauenseuche. [**Importance of Insusceptible Animals and Animals of Low Susceptibility in Relation to the Epiozotology of F. & M. Disease**].—*Ibid.* Oct. 21st. 639-642. [Numerous refs.]

III. WIEMANN. (1938). Die Maul- und Klauenseuche und ihre Verbreitung durch Zwischenträger. [**F. & M. Disease and its Transmission**].—*Dtsch. Tierärztebl.* **5.** 109-112.

IV. HOFMANN, F. (1938). Zur Frage der Uebertragung der Maul- und Klauenseuche durch Ratten. [**The Transmission of F. & M. Disease by Rats**].—*Oest. Tierarzt.* **11.** 161-162.

I. A wild mouflon from the Harz mountains was examined by a veterinarian, who judged it to be affected with mouth lesions of F. & M. disease. It was sent to R., who confirmed the diagnosis. [In the circumstances recorded this cannot rank as an authenticated case of the disease].

II. A valuable review of the literature on the susceptibility of horses, dogs, cats, rabbits, hamsters, mice and other rodents, and hedgehogs to F. & M. disease. The evidence is in some cases incomplete. The horse is not susceptible; dogs and cats can be infected experimentally, though no natural cases have been reported; rabbits have been experimentally infected, but do not contract infection naturally; the same applied to hamsters, mice, and hedgehogs. All these animals have a negligible role in the spread of F. & M. disease.

III. W. states that in established outbreaks, after all the usual restrictions have been set up, human beings are by far the commonest intermediate carriers of infection, and that the various wild animals are unimportant in this respect. A recent order of the Reich Ministry of the Interior takes note of this and restricts the movement of farm personnel.

IV. H. relates from experience the way in which F. & M. disease was spread by rats in a community where an energetic cleaning and disinfection of cow byres had been carried out. He states that such work drives away rats, which move to another convenient building and by so doing may spread infection. Pigs were infected in this way from a byre.—J. E.

MANCINI, A. (1935). Le reazioni allergique e la crisi emoclasica nelle malattie da virus filtrabili (peste bovina). [**The Allergic and General Reaction to the Virus of Rinderpest**].—*Nuova Vet.* **13.** 181-188. 12 tables.

For the preparation of his own antigen, M. took 150 c.c. of virulent blood (defibrinated) from a calf in the third day of marked rinderpest, added 0·3 c.c. of formalin, and left the mixture for three days at normal temperature, stirring several times a day. He then made an emulsion by adding an equal quantity of castor oil. He also used a control antigen prepared similarly but from a healthy bovine.

Twelve calves taken during the first three days of their reaction to artificial infection with rinderpest virus, and five healthy calves, were each injected with 0·5 c.c. of the antigen intradermally into a subcaudal fold. Eight similarly affected

calves were given the control antigen. All of the affected calves developed a haemoclastic reaction, manifested by a leucopenia between 45 and 75 minutes after injection, followed by a leucocytosis after 90-105 minutes. No such reaction occurred in the other two groups of calves.

The reactions are said to have been more intense in animals in the earlier stages of rinderpest than in those in which diarrhoea had begun.—S. F. J. H.

ZWICK, W., WITTE, J., & SCHWARZMAIER, E. (1937). Weitere Untersuchungen über das Virus der Bornaschen Krankheit. [**Further Research on the Virus of Borna Disease**].—*Z. InfektKr. Haustiere.* **52.** 1-10. 4 tables. [8 refs.] [See also *V. B.* **8.** 433].

Results of viability tests are reported. Infected rabbit brain was still virulent after six years' desiccation over $CaCl_2$ *in vacuo*, but was non-virulent after 2-9 months' (different samples) desiccation over KOH.

Dried infected brain powder placed in sealed tubes exposed to light and moderate heat lost its virulence in eight weeks, and similar samples kept in the dark were still virulent after 16 weeks, but not after 24 weeks.

Virulent brain in normal saline allowed to decompose at room temperature in darkness was still potent after 85 days, and similar brain tissue in equine urine was potent for 22 days.—J. E.

LYON, B. M. (1938). **Equine Encephalomyelitis and its Control.**—*N. Amer. Vet.* **19.** No. 12. 22-30.

This is a review of the published work up to November, 1938.

" Following the distribution of 1½ million doses of vaccine in 1938 [in the U.S.A.], no protection failures have been recorded. The disease occurred up to five days after the initial dose of vaccine, indicating pre-infection ". " Our studies indicate a marked increased degree of protection from 2 doses of vaccine as compared with a single dose."

Three horses given two doses of vaccine were solidly immune four months later to intracerebral inoculation of the virus, whereas three controls died. G. pigs are said to be protected in the same way for six months. The formolized chick embryo virus is a staple antigen when kept under refrigeration.—J. A. GRIFFITHS.

CARNEIRO, V. (1937). A encephalomyelite infecciosa dos equideos no Brasil. [**Equine Encephalomyelitis in Brazil**].—*Arch. Inst. biol. Def. agric. anim., S. Paulo.* **8.** 115-134. 14 figs. on 8 plates. [Numerous refs.] [English summary].

A nervous disease of an epizootic nature occurring only in horses was diagnosed in Tatuhy (São Paulo) in March, 1937. The outbreak occurred during a period of exceptionally hot weather, about 60 horses being affected; some horses recovered, but sequelae such as blindness and unsteadiness frequently developed. The symptoms were those of a typical encephalomyelitis, and the disease ran its course in 2-6 days. It was possible to isolate from the brain a virus that passed through Berkefeld N and W filters; it was pathogenic to g. pigs, mice, pigeons and rabbits, and in its pathogenicity, both clinical and experimental, it was very similar to the American virus. The condition was reproduced in horses by the intracerebral or intranasal route; the incubation period was 2½-5 days, and the clinical picture was similar to that of the natural disease. The g. pig is the best animal for the study and preservation of the virus; the histological picture shows typical non-purulent encephalomyelitis.—S. TORRES.

FOTHERGILL, Le R. D., & DINGLE, J. H. (1938). **A Fatal Disease of Pigeons Caused by the Virus of the Eastern Variety of Equine Encephalomyelitis.** —*Science.* **88.** 549-550. [6 refs.]

During a recent epizootic of equine encephalomyelitis in south east Massachussetts, pigeon breeders reported unusual losses in regions where the disease was prevalent. Filtered brain material from a dead pigeon was injected intracerebrally into young albino Swiss mice. They all died in 48-96 hours with symptoms similar to those seen in mice infected with the Eastern type E.E. virus. Cultures of the pigeon brain before injection and of the brains of the dead mice were sterile. The pigeon virus was identified as that of the Eastern variety of E.E. virus by injection into g. pigs previously immunized against the Eastern and Western varieties.

BOYNTON, W. H., WOODS, Gladys M., & WOOD, F. W. (1938). **Field Application of Hog Cholera Tissue Vaccine.**—*J. Amer. vet. med. Ass.* **93.** 291-296. 1 table. [6 refs.]

This report is published to show that tissue vaccine is an acceptable substitute for the serum plus virus method of obtaining an immunity to swine fever. The vaccine is prepared from a fine suspension of virulent tissues from an inoculated pig, the suspension being rendered avirulent by treatment with eucalyptol. A dose of this vaccine is followed two weeks later by a dose of virus. The method has been found safer than the serum-virus method. The vaccine is given when the pigs are six weeks old. Unthrifty or sick pigs are first vaccinated, then revaccinated when healthy, and finally given the virus. Weaned pigs are more likely to attain an immunity than sucklings. The breeding stock are given vaccine alone once a year. 15,125 pigs have been successfully treated by this method.—J. A. G.

PIGOURY, L. (1938). L'agalaxie contagieuse de la chèvre au Liban. [**Contagious Agalactia of Goats in Lebanon**].—*Bull. Soc. Path. exot.* **31.** 194-199. [3 refs.]

Contagious agalactia of goats is prevalent in Lebanon ; it occurs mainly as a slowly spreading epizootic approximately every three years. It was found that one subcutaneous injection of 0·75 g. of stovarsol in 10% solution favourably affected the course of the disease, while urotropine had no effect. Preventive inoculation of these substances was not successful in preventing infection.

—P. S. WATTS.

JACOTOT, H. (1938). La prophylaxie de la rage en Indochine. [**Prophylaxis of Rabies in Indochina**].—*Bull. Off. internat. Epiz.* **16.** 249-252. [3 refs.]

J. describes methods tried out in Indochina for combating rabies in dogs. In 1934, the Pasteur Institute of Nhatrang prepared a vaccine ; dogs were inoculated with fixed virus, and a 1:10 formol suspension was made of brain tissue. It was used as a preventive on dogs, being given twice, at three weeks' interval, or in some cases in a single dose. Between 1934 and 1937, about 10,500 dogs were vaccinated or revaccinated. J. considers, however, that to achieve success in the control of the disease, compulsory vaccination of all dogs would be necessary, together with extermination of all stray dogs.

FERRÁN, J. V. (1936). La vacunación antirrábica por el método supraintensivo de Férran. [**An Intensive Method of Vaccination against Rabies**].—*Siglo méd.* **97.** 675-676. [Abst. from abst. in *Bull. Off. internat. Epiz.* **15.** 65-66].

The virulent brain material for the vaccine is issued in 4 g. amounts, together

with sufficient perchloride of mercury solution to prepare a 10% suspension. The mixture is made up freshly immediately before use. The dose is 2 c.c. on each of five successive days; it is given to human beings subcutaneously in the abdominal region. The mercury salt is said to induce positive chemotropic action on the leucocytes of the animal vaccinated so that the premature transference of the intact rabies virus to the nervous centres by the blood is prevented. In laboratory tests the vaccine gave good results. In Spain this treatment is said to have failed in only 0·5% of 45,000 cases.

HORGAN, E. S. (1938). **The Experimental Transformation of Variola to Vaccinia.** —*J. Hyg., Camb.* **38.** 702-715. 1 table. [Numerous refs.]

Material from virulent outbreaks of human smallpox applied to the skin of monkeys (*Ceropithecus sebaeus*) induced characteristic pustular lesions. In one experiment the monkey strain was established in the rabbit by serial intratesticular or intradermal injections of the virus. Animals so infected were subsequently found to be immune to a standard vaccine lymph.

H. regards his experiments as an example of true mutation of variola into vaccinia, since he considers that contamination with vaccine virus was excluded.
—R. E. GLOVER.

HURST, W. E. (1938). **Myxoma and the Shope Fibroma. 4. The Histology of Shope Fibroma.**—*Aust. J. exp. Biol. med. Sci.* **16.** 53-64. 10 figs. [7 refs.] [See also *V. B.* **7.** 605].

After 17 direct testicular passages in series, neither the OA nor the IA fibroma virus produced lesions more closely resembling those of myxoma than those produced by the original virus before the passages were undertaken. The histological picture from the initiation of the lesion to the ultimate regression are fully described, and also the differences in the cellular responses to these two fibroma viruses. H. is of the opinion that the Shope fibroma is not an intermediate stage " on the road to neoplasia ", but is merely a peculiar reaction to a virus infection.—D. A. G.

I. RIVERS, T. M., WARD, S. M., & SMADEL, J. E. (1938). **A Soluble Antigen from Infectious Myxomatosis in Rabbits.**—*J. Bact.* **36.** 285.

II. BERRY, G. P. (1938). **A Non-Lethal " Mutant " Strain of Virus Myxomatosum Derived from Fibroma Virus.**—*Ibid.* 285-286.

III. HOFFSTADT, Rachel E., & PILCHER, K. (1938). **The Use of Chorio-Allantoic Membrane of the Developing Chick Embryo as a Medium in the Study of Virus Myxomatosum.**—*Ibid.* **35.** 353-368. 14 figs. on 2 plates, 3 tables. [3 refs.]

IV. HOFFSTADT, Rachel E., & PILCHER, K. S. (1938). **A Further Study of the Cultivation of Virus Myxomatosum on the Chorio-Allantoic Membrane of the Chick Embryo.**—*Ibid.* **36.** 286.

V. VAN ROOYEN, C. E., & RHODES, A. J. (1938). **The Immunological Relationship of Shope's Rabbit Fibroma Virus to the Virus of Infectious Myxomatosis: Complement-Fixation Studies.**—*Zbl. Bakt. I. (Orig.).* **142.** 149-153. 2 tables. [8 refs.]

I. The authors have previously reported [*V. B.* **8.** 289.] the presence of a soluble antigen in virus-free filtrates prepared from the infected skin and from the serum of rabbits affected with myxoma.

Methods of purification and the chemical and physical characteristics of the antigen have been studied. Rabbits inoculated with the partially purified antigen dealt with in the earlier paper developed precipitins against the antigen in their

serum, but responded as normal animals to myxoma, neuro-myxoma and fibroma viruses.

II. By inoculation of a rabbit with a mixture of active fibroma virus, present in a suspension of fibromatous testicle, and a suspension of washed myxoma elementary bodies heated at 80°C. (30 min.), the author obtained a non-lethal strain of myxoma virus which he called 80-A. He called it a " mutant " strain because it suddenly appeared with distinctive characteristics which persisted through 23 passages in rabbits in the course of 13 months. It had a low mortality rate and the condition caused could be readily distinguished from myxomatosis and fibroma. Its cultural characteristics differed from those of myxoma.

Inactivated 80-A and fibroma virus, on inoculation into a rabbit, yielded a strain apparently identical with 80-A, which on serial passage appeared stable.

III. The method employed for obtaining a bacteria-free inoculum and for egg inoculation is described. The age of the embryo at inoculation was ten days.

Changes in the chorio-allantoic membrane were most readily produced at an incubation temperature of 37°C. It was later found that chilling by exposure to a temperature of 25°C. caused more profuse changes, especially when incubation was done at a temperature of 35°C.

The virus was passaged serially 33 times through the chorio-allantoic membranes, with evident increase in titre as judged by graduated dilutions inoculated intradermally into rabbits.

Examination of sections of membranes indicated that the primary and most significant changes occurred in the ectoderm. Granular bodies, apparently similar to those seen in myxomatous tissue in rabbits, were consistently present in the cytoplasm of the cells of the ectodermal, mesodermal and endodermal layers of the chorio-allantoic membrane.

IV. It was shown that the optimal temperature for growth was 33°-35°C. The virus grew more readily after a number of serial passages. It caused an infection in the embryo resulting in gross pathological changes, changes in blood picture, and a reduction in hatchability.

V. By means of c.-f. tests, the authors studied specific and cross-reactions between myxoma and fibroma antisera and the respective antigens. Three methods of production of anti-myxomatous sera were used. The technique of the c.-f. test employed is described, and the results are tabulated.

No cross-reactions were observed. The reactions were specific for both fibroma and myxoma virus, and the authors conclude that their work has failed to show any serological relationship between the two viruses.—L. E. Hughes.

Andrewes, C. H., & Ahlström, C. G. (1938). **A Transplantable Sarcoma Occurring in a Rabbit Inoculated with Tar and Infectious Fibroma Virus.** —*J. Path. Bact.* **47.** 87-99. 3 figs. on 1 plate, 2 charts. [11 refs.]

The authors have already shown [*V. B.* **9.** 162.] that the infectious fibroma virus may produce in tar-treated animals tumours resembling true neoplasms. In this article they describe a fibro-sarcoma induced in the rabbit by similar means.

The animal was treated with tar on several occasions and was subsequently injected intravenously with fibroma virus. A fibro-sarcoma was produced which was passaged through several generations of rabbits and finally became transmuted into a metastatic sarcoma which was not invariably progressive. The fibroma virus entirely disappeared and no other virus was demonstrable. Moreover, immune fibroma serum failed to neutralize the sarcoma. Stimulation of regressing tumours of this type was effected by injecting fibroma virus intravenously.

—R. E. Glover.

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

DZASOCHOV, G. S. (1937). Rolj členistonogih v perenose infekcionnoĭ anemii lošadeĭ i osnovinje mery po borijbe s nimi. [**The Role of Arthropods in the Transmission of Equine Infectious Anaemia**].—*Sovyet. Vet.* No. 4. pp. 26-29.

D. mentions the possibility of E.I.A. being transmitted by arthropod parasites, but the body of the article is devoted to measures for the control of such parasites.

MOORE, W. (1938). **Report upon Hill of Fare " Sheep Tick ". Eradication Experiment for 1937.** pp. 11. 1 table. [fcp] [Mimeographed].

This report includes the details of the plan and first year's progress of a long term experiment upon the control, by serial dipping, of the sheep tick *Ixodes ricinus* on a 6,000 acre hill in southern Aberdeenshire, separated from other tick-infested areas by several miles of arable land. The attack was concentrated upon the adult female, which is parasitic upon mammals only. The number of wild mammals was reduced to a minimum by systematic shooting and trapping. 471 sheep inoculated with louping ill vaccine, and 29 not inoculated, were grazed on the hill from May to October. All the sheep, except six controls, were dipped each week in a derris dip. The most efficient strength of derris was found to be one part *Derris elliptica* (containing 5% rotenone) to 500 parts of water. During the year 36 of the inoculated and 13 of the un-inoculated sheep died. The continuous dipping had no apparent adverse effect upon the sheep.

In north-east Scotland the tick is active from early spring to late autumn, with a peak period in July.

MACKERRAS, M. J. (1938). **Losses Due to the Sheep Blowfly.**—*J. Coun. sci. industr. Res. Aust.* **11.** 97-102. 5 tables. [Numerous refs.]

After setting out the sheep population and average wool production per sheep in the principal wool producing countries, the relative incidence of fly strike and the species of flies concerned are briefly dealt with. Consideration is then given to estimates which have been made by various observers of the losses (financial and otherwise) in Great Britain and the Dominions, with a detailed consideration of the position in Australia. Previous estimates in Australia, the basis for which is not quoted, have varied enormously. Whereas, for instance, FROGGATT in 1914 put the loss at £1,000,000 per annum for New South Wales, MCLEOD and HOLME at about the same time estimated it at £377,700. The great difficulty of arriving at a dependable estimate is obvious, since, in addition to costs of prevention and curative measures, the loss by deaths, deterioration of the fleece, loss of struck wool and interference with growth and nutrition must also be taken into account. The actual costs of fly strike in three studs and five ordinary flocks, collected and published by BELSCHNER in 1937 [*V. B.* **8.** 578.], averaged £198 per 1,000 stud sheep and £35 per 1,000 flock sheep. Using this latter figure as a basis and assuming it to be applicable to the whole sheep population of Australia, the total cost to the Commonwealth would be approximately £3,856,000. [As M. remarks, to apply BELSCHNER's average for flock sheep to the whole of Australia " may or may not be justifiable ". The costs in the five ordinary flocks he investigated varied from £8 to £93 per 1,000 sheep]. It is pointed out that while the cost of some preventive measures is considerable, the advantage of the fold removal operation, or selective breeding for a relatively plain bodied type, is that a considerable degree of permanent protection may be obtainable without increasing production costs.

—D. A. GILL.

MACFARLANE, W. V. (1938). **Blowfly Strike in Marlborough. Incidence and Control Discussed.**—*N.Z. J. Agric.* **57.** 388-392. 2 figs., 1 table.

M. discusses the incidence and control of myiasis in Marlborough. Maggots found on sheep were bred out at the Cawthron Institute, Nelson, and found to be chiefly *Calliphora laemica.* About 590 of the Marlborough strikes contained specimens of *Lucilia sericata. Chrysomyia rufifacies* and *Ophyra analis* were rare. In contradistinction to Australian findings, a succession of flies in a lesion was found to be unusual in New Zealand.

Urine staining, largely in the presence of crutch wrinkles and vulval malformations, was considered to be the main predisposing factor to crutch strike. Back strike is considered more important than crutch strike in New Zealand.

—L. W. N. FITCH.

I. FRENEY, M. R. (1937). **Studies on the Chemotropic Behaviour of Sheep Blowflies.**—*Pamphl. Coun. sci. industr. Res. Aust.* No. 74. pp. 24. 2 figs. on 1 plate, 6 tables, 3 graphs. [15 refs.]

II. MACKERRAS, I. M., & FULLER, M. E. (1937). **A Survey of the Australian Sheep Blowflies.**—*J. Coun. sci. industr. Res. Aust.* **10.** 261-270. 1 fig., 7 tables. [12 refs.]

III. LEE, D. J. (1937). **A Laboratory Method for Testing Tropisms of Blowflies.**—*Ibid.* 271-274. 1 fig.

IV. MCCULLOCH, R. N. (1937). **The Present Position in Blowfly Control in New South Wales with Special Reference to the Problems Associated with Jetting.**—*J. Aust. Inst. agric. Sci.* **3.** 129-137. 3 figs. [20 refs.]

I. After a review of the literature, the methods and apparatus used are described, the latter being illustrated. The chemotropic responses of sheep blowflies were studied by field trapping methods, and it was assumed that the attractiveness of a bait to any species was proportional to the number trapped. A large number of pure chemicals were tested, including many known to be formed during putrefaction. Of these only ethyl mercaptan was attractive. Tests with numerous tissues showed that none were specifically attractive to primary flies.

It was found that alkaline sulphides and neutral or slightly alkaline buffering agents enhanced the attractiveness of carrion to all species of flies, while poisons, preservatives and protein precipitants prevented carrion from becoming attractive. The addition of small amounts of calcium carbonate to carrion increased both its attractiveness and the amount of volatile sulphur compounds subsequently evolved.

Tests with a type of trap used in the field showed that the addition of sodium or calcium sulphide to the bait resulted in an increase in the numbers of flies trapped.

When the odour of acetic acid was allowed to mingle with the odours of putrefying spleen, the attractiveness of the latter was enhanced, while the odours of chlorine or iodine decreased this attractiveness.

Distillation and extraction of attractive carrion baits did not yield highly attractive substances. Hydrolysis of certain unattractive materials—*e.g.* fresh egg yolk and egg white—with sodium sulphide solution rendered them attractive. Preparations from the skin and excreta of sheep were not attractive to flies. " Struck " fleece appeared to be only slightly attractive.

II. This paper summarizes the results of an extensive survey of several years' duration. Examination of material from 1,691 strikes from all the sheep-raising areas of Australia showed that *Lucilia cuprina* is the most important and wide-spread of the sheep blowflies in the Commonwealth. *Calliphora spp.*, particularly *C. nociva*, are responsible for about one-fifth of the strikes, chiefly in

southern districts, but *L. sericata* is of no practical importance. The species of flies which attack sheep in Australia are listed. Tables show " strikes " recorded from commercial flocks in six States, field strikes recorded in the experimental flock maintained at the laboratory at Canberra, the incidence of flies according to regions (moist, temperate, and hot, arid areas being compared) in commercial flocks, the relative incidence of the species of *Calliphora* in strikes, the relative incidence of strikes on different parts of the sheep, the incidence of species in strikes on different sites, and, finally, the strikes due to one species only. The distribution of flies is discussed, and that of *L.c.* illustrated by a map.

III. The apparatus used is fully described and the numerous difficulties encountered are discussed. The chief object of the apparatus was to test the olfactory tropisms of flies. It was necessary to fulfil a number of requirements: the apparatus should be large enough to permit freedom of flight, illumination should be equal for all aspects of the apparatus, and chance catches in empty traps should be reduced to a minimum. The apparatus and difficulties encountered cannot be fully described in an abstract.

IV. The author states that there is at present little promise of finding the " solution of the blowfly problem " by methods aiming at a reduction in the blowfly population. Such methods include biological control, carcass destruction, trapping and poisoning.

Measures which aim at protecting the sheep are maintenance of health, breeding for insusceptibility, the Mules operation, hand dressing, crutching, and jetting. It does not appear that susceptibility can be reduced by breeding or by surgical removal of wrinkles, to the point of rendering repeated crutchings or jetting unnecessary and thus avoiding constant handling. Hand dressing cannot be much improved, for even if the ideal dressing were discovered, the method would still involve excessive handling of sheep during a fly " wave ". Present dressings give almost complete freedom from re-strike, except during a fly " wave ". Crutching is a valuable measure, but is expensive, cannot be carried out on short notice at the onset of a fly " wave " and will not carry ewes through the lambing period in an insusceptible state. Jetting, though slightly less effective than crutching, is much cheaper and can be carried out at very short notice at the onset of a fly " wave ". A combination of crutching and jetting, modified according to district and season, appears to offer the cheapest and most effective method for control of fly strike. Certain objections to jetting are discussed and its technique is illustrated.—H. McL. Gordon.

Knipling, E. F., & Rainwater, H. T. (1937). **Species and Incidence of Dipterous Larvae Concerned in Wound Myiasis.**—*J. Parasit.* **23.** 451-455. 3 tables. [4 refs.]

A study of the species of fly larvae concerned in 900 instances of wound myiasis in man and animals, occurring between June 1935 and April 1936 in the south eastern and to a lesser extent in the middle western and south western States of the U.S.A., showed that *Cochliomyia americana* [= *C. hominivorax*], spoken of as the primary screw worm fly, was present in 90% of the cases. Other species occurred in 13% of cases, the commonest being *Phormia regina* and *Lucilia sp.* *C. macellaria* and *Sarcophaga sp.* occurred in a few cases.

The highest numbers of cases of wound myiasis, both by *C.a.* and by secondary species, occurred in cattle and swine. Relatively few occurred in sheep, horses and mules. The secondary species were taken from a wider range of hosts than was *C. americana*.—J. MacLeod.

DOTY, A. E. (1937). **Convenient Method of Rearing the Stable Fly.**—*J. econ. Ent.* **30.** 367-369. [6 refs.]

D. describes previous work on the rearing of *Stomoxys calcitrans* and gives details of a method devised for breeding these flies in large numbers for insecticidal tests of cattle sprays. Compared with the housefly, the stable fly is less resistant to sprays containing pyrethrum, rotenone or thiocyanates. The reaction of the stable fly to repellents is similar to that of the housefly.—R. P. HOBSON.

ROBERTS, F. H. S. (1938). **Cattle Lice: Their Economic Importance in Queensland.**—*Aust. vet. J.* **14.** 55-58. [8 refs.]

The following species of lice have been recorded from cattle in Queensland :– *Haematopinus eurysternus*, *H. tuberculata*, *Linognathus vituli*, *Solenoptes capillatus* and *Bovicola bovis*. Most of these species appear to be widely distributed. The species chiefly implicated is *H.e.*; next in importance is *L.v.* There is abundant evidence that heavy infestations can be responsible for much loss in condition. Lice may be present at any time of the year, but it appears that infestations reach serious proportions only in certain circumstances, *viz* :– in winter and spring when pastures are dry, animals are poor in condition, external temperatures are moderate and the animals have their winter coats ; during drought, when poverty appears to be the predisposing factor ; on unthrifty animals at any time of the year, and on animals in good condition when stabled for any considerable length of time and not groomed.

It appears that the prevalence of lice can best be explained, not directly by any one of the factors mentioned above, but by the assumption that the activities of the parasites are in some way governed by the condition of the skin or coat. With the advent of good rains the coat is washed clean and with the resultant good supply of nutritious food the skin and coat so become unfavourable for the propagation of the parasites.—H. McL. GORDON.

PEREIRA, C. (1937). Dados ecologicos sobre ovos e nymphas hexapodas de "boophilus microplus" (Canestrini, 1888). [**Ecology of the Eggs and Hexapod Larvae of** *B.m.*]—*Arch. Inst. biol. Def. anim., S. Paulo.* **8.** 135-144. [English summary].

P. observed that all eggs floating on water hatched after the normal incubation period (41 days), but that only 25% of eggs immersed in water hatched normally. Eggs buried as deep as 10 cm. in earth naturally dry or saturated with moisture hatched in the normal time. Larvae that had been moistened in different ways had a lowered resistance to the normal conditions of life. They could live for 73 days immersed in water ; the most efficient exciting agent while in the resting state was heat. They refused to attack human beings in experimental conditions. In the culture tubes, which were 1 m. high, the larvae formed clusters about 7 cm. from the bottom ; P. infers that in nature the larvae of *B.m.* stay chiefly on the lower parts of plants, and climb to the higher parts only when disturbed. —S. TORRES.

HENRY, M. (1938). **The Kangaroo Tick.**—*Aust. vet. J.* **14.** 69-71.

*Argas Gurneyi-Warburtoni* is normally a parasite of kangaroos, but it has also been recorded from other native fauna, from dogs, and occasionally from man. It is confined to an extensive semi-arid area of Western and Central Australia, the Northern Territory and Western Queensland. The adult ticks are said to occur in the soil up to two inches below the surface, under trees, bushes, etc., on kangaroo camps, in wallaby caves, and elsewhere. On man, the tick may become

fully engorged in 5-10 minutes. The bite is often severe and may give rise to a large swelling and sometimes alarming symptoms, including loss of consciousness and visual disturbances, and the area surrounding the bite may become completely anaesthetized. When bitten, kangaroos did not hop away for ten minutes or so, even on the approach of human beings, and finally hopped very unsteadily.

—H. McL. Gordon.

I. Bartels, & Döring, J. (1938). Die Bekämpfung der Schafräude in den Reg. Bezirken Kassel und Erfurt im Jahre 1937. [**Control of Sheep Scab in the Kassel and Erfurt Districts in 1937**]. *-Dtsch. tierärztl. Wschr.* **46.** 291-298. 3 tables.

II. Bartels. (1938). Ueber Verluste beim Baden von Schafen. [**Losses in the Dipping of Sheep**].—*Ibid.* 433-436.

I. A detailed account of the 1937 campaign. In the Kassel area every flock of sheep was dipped, and in the Erfurt area only those in which sheep scab had been found at a preliminary examination. Double dipping with lime sulphur was used, and was applied by travelling outfits consisting of a dipping tank and cooking apparatus for preparing the dip fluid, three men being in attendance. Veterinary surgeons directed the work and examined all sheep about six weeks after the second dipping. About 182,000 sheep were dipped, with an efficiency approaching 100%.

II. In the above campaign, 156 sheep died from the effects of dipping. The cause of death was the entry of lime-sulphur into the alimentary tract, nasal cavities and sinuses or into the lungs; 115 of the casualties died from pneumonia. The P.M. diagnosis of these three effects of the dip is detailed.

The factors having an influence on such mortality are discussed; it is impossible to guarantee that no loss will occur, but it can be avoided to a large extent. [See also *V. B.* **9.** 319. for data on types of dipping tanks. In 1937 one type only—the so-called medium tank—was used].—J. E.

Kotlán, S. (1936). A rühatkák fajlagosságának kérdéséhez. [**Specificity of Mange Mites**].—*Állatorv. Lapok.* **59.** 345-347. [12 refs.]

This is a review, and it contains no original observations. K. discusses the Sarcoptidae at some length and adds notes on the other mange mites. He refers to the different varieties of *Sarcoptes* of man and animals and says that *S. canis* is not species-specific, but that *S. bovis* is so, and suggests that other varieties lie between these two species in this property. [The evidence on this point is very meagre and it seems probable that adequate *ad hoc* research still remains to be done].

K. points out that mites may be conveyed to an unusual host and that they may then burrow into the skin and set up a typical mange lesion, but that unless they can also reproduce and persist as a colony through a number of generations, they cannot be said to be true parasites on the new host; the fact that parasites may cause a lesion in an unusual host in which it heals spontaneously is not evidence that the parasites are not species-specific.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

Morgan, D. O., & Wilson, J. E. (1938). **Observations on the Helminth Parasites of Poultry in Scotland.**—*J. Helminth.* **16.** 165-172. 1 table. [4 refs.]

In the course of a survey extending over two years, the authors recorded

observations on the helminth parasites found during P.M. examinations of 1,113 fowls ranging in age from six months to two years. The species encountered are enumerated and the percentage of birds carrying parasites and the average incidence is given.

On the assumption that gross infestation with any species is pathogenic, it was found that the only species present in sufficient numbers to be likely to cause wide-spread damage were *Heterakis gallinae*, *Capillaria* spp. and *Davainea proglottina*. The number of species recorded during the course of the survey was low.

No significant relationship was noted between parasitized fowls and the common diseases of poultry, including fowl paralysis. In the table, the figures for all species encountered, except one, are lower for the healthy birds examined than for the diseased birds of the survey ; they are also lower for healthy birds of the survey than for birds on a poultry farm where the incidence of F.P. was particularly high. In the 53 cases of tuberculosis examined, worms were very often absent, or present in small numbers only.—L. E. Hughes.

I. Wetzel, R., & Enigk, K. (1936). Ein Beitrag zur Kenntnis der Parasitenfauna des deutschen Hochwildes. [**The Parasites of German Mountain Game**].—*S. B. Ges. naturf. Fr. Berl.* pp. 162-164.

II. Wetzel, R., & Enigk, K. (1937). Ein weiterer Beitrag zur Kenntnis der Parasitenfauna des Elches (Alces alces). [**Parasites of the Elk**].—*Z. Parasitenk.* **9.** 695-697. [11 refs.]

I. The authors report what they claim to be the first record of the helminths mentioned below :– *Fasciola hepatica* was found, in the European bison and elk, apparently originating from infested red or fallow deer on the same ground. Eggs of *Moniezia sp.* were found in the faeces of the elk and bison, in the former apparently derived from Canadian animals infested with *M. benedeni*. Eggs of *Strongyloides sp.* were demonstrated in the faeces of bison and mouflon sheep. Nematode eggs which appeared to be those of *Ostertagia* or *Trichostrongylus* occurred in the faeces of bison and elk, and eggs of *Nematodirus sp.* in the faeces of elk. *Haemonchus contortus* and *O. circumcincta* were observed P.M. in an elk. *Dictyocaulus viviparus* occurred in bison, probably from red deer, fallow deer and roe deer, which were also found to be infested. *Muellerius capillaris* occurred in bison, *Trichuris globulosa* in elk, and eggs of *Tr. ovis* in the faeces of bison and mouflon. In addition, cysts morphologically resembling those of *Eimeria zurnii* were found in bison, and *E. intricata* cysts in the faeces of elk.

II. Further to their list in I [above] the authors report the finding of four more new helminth parasites in the European elk. Several *Setaria labiato-papillosa*, 50-75 mm. long, were recovered P.M. from the abdomen of one animal, and *Strongyloides papillosus* was recovered from the small intestine of another, which was also infested with *Bunostomum trigonocephalum*. A *Cysticercus* was recovered from another elk [see next abstract]. An elk infested with *Cephenomyia* also yielded third stage larvae of *Pharyngomia picta*, previously only found in the red deer.

Wetzel, R., & Enigk, K. (1938). Muskelfinnen beim Elch. [**Cysticercosis in the Muscles of Elk**].—*Z. InfektKr. Haustiere.* **52.** 273-281. 2 figs., 3 tables. [Numerous refs.]

*Cysticercus* was demonstrated for the first time in a European elk ; the animal was also heavily infested with nematodes. *C. tenuicollis* were found in the parenchyma, connective tissue and serous coat of the liver. Cysts were also found in the myocardium and the left masseter muscle.—A. T. Phillipson.

ALICATA, J. E. (1938). **Observations on the Life History of Fasciola gigantica, the Common Liver Fluke of Cattle in Hawaii, and the Intermediate Host, Fossaria ollula.**—*Bull. Hawaii agric. Exp. Sta.* No. 80. pp. 22. 6 figs., 3 tables. [16 refs.]

After giving a short historical résumé of fascioliasis in Hawaii, A. states that *Fasciola gigantica* is the only liver fluke so far recovered, and, of the fresh-water snails present, *Fossaria ollula* is the only intermediate host. At a temperature of 78°-82°F. eggs of *Fasciola gigantica* required 14 days to hatch as miracidia.

The various stages in the snail are described. Motile cercariae were found to escape from snails 39 days after experimental infestation. Metacercariae encysted on honohono plants which were replanted in an exposed sunny area, were found to be viable after 15 days but not after 42 days, indicating the lethal effect of sunlight and dryness on encysted metacercariae. Encysted metacercariae kept in running water for 122 days were able to infect laboratory animals. No live metacercariae were recovered from infected ensilage after three months storage.

The highest dilution of copper sulphate found to be effective against newly hatched miracidia was 1:32,000. Sea water either undiluted or diluted 1:1 with fresh water was also effective. The characteristics and locations of *Fossaria ollula* are described.—R. FISHER.

EDGAR, G. (1938). **Paramphistomiasis of Young Cattle.**—*Aust. vet. J.* **14.** 27-31. 2 figs. [7 refs.]

The author describes *P. cervi* infestation affecting young dairy cattle less than one year old. The disease occurs in late winter months on the south coast of New South Wales, and mortality may be as high as 30%. Anaemia, debility and diarrhoea are the characteristic symptoms. Concurrent infestation with *Monodontus phlebotomus* appears to be a contributing factor. Numerous immature *P.c.* were found in the duodenum, the mucosa of which showed considerable hypertrophy. It is suggested that the fresh-water snail *Bullinus gibbosus* is probably the intermediate host.—H. McL. GORDON.

I. PENFOLD, W. J., PENFOLD, H. B., & PHILLIPS, Mary. (1938). **The Distribution of Cysticercus bovis in the Sites of Election in the Ox.**—*Med. J. Aust.* Jan. 15th. 107-113. 2 tables. [5 refs.]

II. PENFOLD, H. B. (1938). **An Attempt to Immunize Lambs against Hydatid Disease.**—*Ibid.* Feb. 26th. 375-377. [13 refs.]

I. In 145 infested cattle examined, the distribution of cysts between the heart, the masticatory muscles, the tongue and the diaphragm was in the ratio of approximately 8:4:1:1. In about 88% of animals with only 1-3 cysts distributed in the heart, the masticatory muscles, the tongue or the diaphragm, infestations may be detected by complete examination of the heart and masticatory muscles alone. It is stated that probably in all animals with four or more cysts distributed in the heart, the masticatory muscles, the tongue or the diaphragm, infestation may be detected by complete examination of the heart alone. In practice it was found that, in light infestations, if four cysts were found at the sites of election, four cysts were also found in the whole dressed carcass, whereas in heavy infestations the proportion between findings at a site of election and in a whole dressed carcass was 1:20.

II. No immunity sufficient to protect against infestation was produced in any one of four lambs, each inoculated with a total of 66 ml. of antigen consisting of ground hydatid membrane suspended in carbolized hydatid fluid. P. states that examination of faeces for ova is not a satisfactory method for detecting light

infestations with *Echinococcus granulosus* in dogs. It is noted that hydatid cysts produced in nine-month-old sheep by feeding with echinococcus ova were sterile, and measured 2-5 mm. in diameter.—H. McL. Gordon.

Harwood, P. D., & Luttermoser, G. W. (1938). **The Influence of Infections with the Tapeworm, *Raillietina cesticillus*, on the Growth Rate of Chickens.** —*Proc. helminth. Soc. Wash.* **5.** 60-62. 1 table.

The authors paired off chickens 2-4 weeks old according to weight and gave one of each of 41 pairs various numbers of infective cysticercoids of *R.c.* (obtained from *Aphodius spp.* and *Tribolium spp.* of beetles), the other chick in each pair serving as a control.

The diet fed to the first experimental birds was low in available manganese and resulted in one case of " porosis " [? perosis], but the diet was adjusted for the remaining experiments.

The weights of the chicks were recorded at weekly intervals and the greater increase in each experiment was in the control birds. In spite of " porosis " the control bird in the first experiment gained weight more quickly than its infested mate.

The number of cysts fed varied from 40 to 1,000, and the most tapeworms found in any bird six weeks after dosage was 155 (1,000 cysts fed).

Critical analysis of the results indicated that the infestations had an injurious effect, proportionate to the degree of infestation, on the growth rate of chicks fed adequate rations, this effect being enhanced when the diet was deficient in manganese.—C. V. Watkins.

Lucker, J. T. (1938). **Vertical Migration, Distribution, and Survival of Infective Horse Strongyle Larvae Developing in Feces Buried in Different Soils.**— —*J. agric. Res.* **57.** 335-348. 1 fig., 5 tables. [14 refs.]

Migration of larvae to the surface was found to be significantly affected by soil type. This factor also appeared to influence the number of larvae persisting in the faeces and deeper soil layers a few months after the faeces had been buried. Increased depth of burial in a given soil clearly reduced the degree of migration of larvae from the faeces to the soil surface. It is probable that the unverse relationship between depth of burial and amount of migration of larvae to the surface is in some degree related to the effect of depth of burial on larval development or survival, or both. [For experimental results the original must be consulted]. —R. Fisher.

Sugimoto, M., & Nishiyama, S. (1937). **On the Nematode, *Tropisurus fissispinus* (Diesing, 1861) and its Transmission to Chickens in Formosa.**—*J. Jap. Soc. vet. Sci.* **16.** 305-313 of pt. 1. 5 figs. on 1 plate, 3 tables. [3 refs.] [In Japanese : abst. from English summary pp. 37-39 of pt. 2].

Investigations in Formosa have shown that the grasshoppers *Pternoscirta sauteri*, *Heteropternis respondens*, *Gastrimargus transversus*, and *Atractomorpha bedeli*, the cockroaches *Periplaneta americana*, and *P. australasiae*, and the earthworms *Perichaeta candida* and *Allolobophora foetida*, must now be regarded as additional intermediate hosts for *Tr.f.* in chickens and ducks.

Grasshoppers, cockroaches and earthworms reared under experimental conditions were fed chicken droppings containing embryonated eggs of the nematode. Infestation was readily acquired, and the larvae became infective in 9-28 days.

The infective larva is 1·5 to 2 mm. long. The head end is blunt and simple, but the tail end has a circle of 12 equal papillae. The muscular portion of the

oesophagus averages 182μ and the glandular portion 448μ. Distinct cross striations may be observed in the cuticle.

Ingestion of the intermediate host sets the larvae free in the proventriculus, where they enter the glands of Lieberkühn and become mature in about 90 days.

—D. D. Ogilvie.

Bachman, G. W., & Gonzalez, J. O. (1936). **Immunization in Rats against Trichinella Spiralis.**—*Proc. Soc. exp. Biol., N.Y.* **35.** 215-217. [3 refs.]

Attempts were made to immunize four groups of rats against *T. spiralis.* The methods tried were the feeding of trichina antiserum, of dry trichina powder or of increasing doses of infested meat, and the intraperitoneal injections of Coca's alkaline suspension of trichina powder. The only method which gave any protection was the feeding of infested meat. Rats so treated survived feeds of 10 mg. of infested meat, which is twice the lethal dose for normal rats.

Buckley, J. J. C. (1938). **On** *Culicoides* **as a Vector of** *Onchocerca gibsoni* **(Cleland & Johnston, 1910).**—*J. Helminth.* **16.** 121-158. 9 text figs., 29 figs. on 5 plates, 9 tables. [Numerous refs.]

B. discusses the possible vectors of *O.g.* and suggests that *Culicoides* may be responsible. A high percentage of cattle in Malaya are infested. Diagnosis of *O.g.* in live cattle was carried out by examining slices of skin placed on a slide with normal saline and searching for microfilariae. Estimates were also made of the intensity of skin infections, which varied considerably. *Culicoides* were collected on live cattle, and microscopic examinations were made, some at once and some after maintenance in the laboratory. The various species of *Culicoides* and *Lasiohelea* are enumerated, and the morphology of the various filarial larvae found is described. It was found that 0·52% of 1,523 *C. pungens* dissected soon after an infective blood meal had picked up microfilariae, 0·96% of 1,670 dissected some days after an infective meal were found to have developing or mature filarial larvae in the thorax or head, and 0·35% of this species were found to be naturally infected. Other species of *Culicoides* were found to carry microfilaria to a varying degree.

—R. Fisher.

Rao, M. A. N. (1938). *Dipetalonema dracunculoides* **(Cobbold, 1870).**—*Indian J. vet. Sci.* **8.** 127-130. 3 figs. [6 refs.]

The presence of *D.d.* in India is recorded for the first time. R. obtained 18 male and 43 female worms from the peritoneal cavity of an indigenous dog.

The male worms are 22-27 mm. in length, with smooth cuticles and tapering extremities. The tail is spirally coiled and bears two lateral digitations. There are six pairs of anal papillae and two unequal spicules. The mouth is simple and has two lateral papillae. The female worms are 30-55 mm. long. The head end is similar to that of the male, but the tail end is simple, and uncoiled. The vulva is about 1·5 mm. from the head end. The embryos are unsheathed, 200-225μ in length, and are indistinguishable from those of *Microfilaria lewisi.*—D. D. Ogilvie.

van den Berghe, L. (1937). Une microfilaire du sang de l'éléphant au Congo Belge. [**A Microfilaria from the Blood of an Elephant in the Belgian Congo**].—*Ann. Parasit. hum. comp.* **15.** 229-230. 2 figs.

A microfilaria isolated from the blood of a young African elephant—one of 42 elephants examined—showed the following characteristics when stained with Giemsa :– no sheath, posterior end prolonged, anterior end rounded and broad, length 180-200μ, breadth 6·5-7μ. The "nuclei" were very small, measuring less

than 1$\mu$ in diameter, and were arranged in rows of 6-8 across, except at the posterior end where they were arranged in a single line. The column of nuclei was broken by a definite band 2$\mu$ wide which was about 35$\mu$ from the anterior end.

B. states that microfilariae have never before been seen in the blood of elephants in Africa, and thinks that this specimen should be given the name of *Microfilaria loxodontis.*

## IMMUNITY

CELORIA, M. (1938). La production de tubercoline dans certaines milieux synthétiques. [**Production of Tuberculin in Synthetic Media**].—*Boll. Sez. ital. Soc. int. Microbiol.* **10.** 69-70. [In French].

C. compares three different synthetic media for tuberculin production. The richest growth and the highest yield of tuberculin were obtained with Sauton's medium. In comparison the medium of Model and Lidelnikowa contains a larger quantity of bipotassium phosphate and glycerin, less magnesium sulphate and no asparagine (pH 7·4). In Wong's medium, glycerin is replaced by glucose and saccharose, and nitrogen is derived from ammonium malate (pH 7·2). If the pH becomes more alkaline during the preparation of the medium, a precipitate of phosphates is formed and the nutritive value of the medium is lost. C. maintains that the two latter media have no advantages over Sauton's medium.—E. C. HULSE.

GOTTSCHALL, R., & BUNNEY, W. E. (1938). **A Diluent for Stabilizing Tuberculin "O.T." Diluted for the Mantoux Test.**—*J. Immunol.* **34.** 103-115. 5 tables. [17 refs.]

A diluent of borax, boric acid, and sodium chloride containing 0·04% gum arabic and 0·5% phenol with pH 7·2 was used to dilute 21 different tuberculins to $10^{-4}$; in 85% the potency was not diminished when incubated at 37·5°C. for 35 days. The tuberculin was found to remain stable after prolonged shaking in glass vials, after exposure to indirect sunlight for four months at laboratory temperature, and after transportation to tropical climates.—E. C. HULSE.

HOOKER, S. B., & BOYD, W. C. (1937). **The Nonspecificity of the Flocculative Phase of Serologic Aggregation.**—*J. Immunol.* **33.** 337-353. 1 plate, 2 tables. [Numerous refs.]

Quoting freely from the literature, the authors have shown that whilst MARRACK, HEIDELBERGER, TOPLEY, DUNCAN and their respective followers believe that visible flocculation consists of the specific formation of a three-dimensional lattice-work of antigen-antibody molecules joined by free antigen, there are, nevertheless, grounds for the belief that antibody-antigen molecules unite specifically and that the subsequent formation of larger (visible) particles is a non-specific reaction.

If there is excess antigen in a precipitative reaction no precipitate is formed, whereas excess antibody has only a slight effect in this direction. According to the lattice theory, however, excess of antigen or of antibody should inhibit the reaction equally. [This argument would be more convincing if available evidence suggested that antigen and antibody molecules are of the same order of size]. If a bacterial suspension is mixed with a very strong antiserum all the antigen surface would be coated with antibody, leaving no free antigen. According to the lattice theory, therefore, all strong antisera should inhibit agglutination, but this is not actually the case. Again, the lattice theory does not satisfactorily explain the need for electrolyte in serological reactions.

Passing on to their own experimental data the authors claim that the velocity of flocculation in the region of excess antibody is a linear function of the dilution of the antigen which can be expressed in terms of a recognized theory of organic flocculation. By mixing two non-cross-reacting flocculating systems (the two antisera having approximately the same flocculation velocity) it was found that the velocity of flocculation increased in proportion to the total number of antigen molecules in the mixture. This point supports the theory that flocculation is a secondary non-specific phase of precipitation or agglutination. According to the lattice theory, on the other hand, the mixing of two independent systems should retard flocculation on account of the molecules in the two systems interfering with one another and slowing down the rate of contact between corresponding antigen and antibody molecules.—E. J. PULLINGER.

I. PIROSKY, I. (1938). Sur l'existence, chez les variantes smooth et rough d'une souche de *Pasteurella aviseptica* de deux antigènes glucido-lipidiques sérologiquement distincts. [**Two Serologically Distinct Glyco-Lipid Antigens from Rough and Smooth Strains of** *Past. aviseptica*].—*C. R. Soc. Biol. Paris.* **128.** 346-347. [2 refs.]

II. PIROSKY, I. (1938). Sur la spécificité des antigènes glucido-lipidiques des *Pasteurella* et sur leurs affinités sérologiques avec les antigènes glucido-lipidiques des *Salmonella*. [**The Specificity of the Glyco-Lipid Antigens of Pasteurella and Serological Affinities with those of Salmonella**].—*Ibid.* 347-350. [4 refs.]

I. Sera were prepared in rabbits from rough and smooth variants derived from the same strain of *Past. aviseptica* (No. 2482, Lister Institute). Cross-precipitation tests performed with these sera, using as antigens glyco-lipids obtained from trichloracetic acid extracts of the variants, demonstrated that the antigens were serologically distinct.

II. Antigenic glyco-lipids prepared from four strains of pasteurella showed several points of similarity with antigens of the same nature prepared from typhoid and Gärtner bacilli, namely in their reactions to anti-bacterial and to sera against the glyco-lipids, and in their behaviour in the presence of certain chemical salts. —A. W. T.

SCHWARTZ, R. (1938). De la production des anticorps au moyen de l'immunisation " concentrée " avec le BCG chez le lapin. [**" Concentrated " Immunization with BCG in Rabbits**].—*C. R. Soc. Biol. Paris.* **127.** 100-103. 1 ref.]

Two groups of rabbits were inoculated with single or multiple doses of BCG and the subsequent antibody production was estimated by the complement-fixation test. Frequently repeated small doses (0·05 mg. four times daily for seven days), introduced subcutaneously into different parts of the body, produced a serum more rapidly and richer in antibody than did the inoculation of one large dose (2 mg. subcut.). In rabbits receiving multiple injections into one or two sites only there was extensive inflammation at those sites, and a high mortality.—E. C. HULSE.

WOLTERS, K. L., & DEHMEL, H. (1938). Experimentelle Versuche zur aktiven Immunisierung mit Alaunpräzipitat-Mischimpfstoffen. [**Active Immunization with Alum Precipitate Mixed Vaccines**].—*Dtsch. tierärztl. Wschr.* **46.** 342-345. 3 tables. [12 refs.]

G. pigs were inoculated with an alum-precipitated toxoid mixed with a vaccine of a bacterium of a species different from that which produced the toxin, and antibodies against the toxin and bacterium were formed independently and as effectively

as if either antigen had been inoculated alone. It is suggested that a useful veterinary application of this would be the simultaneous immunization of horses against strangles when they are being immunized for the preparation of either diphtheria or tetanus antitoxin.—E. J. PULLINGER.

I. RAMON, G. (1937). L'immunité et l'influence des " substances adjuvantes et stimulantes " injectées en mélange avec l'antigène. Introduction à une étude d'ensemble. [**Immunity and the Influence of Adjuvant and Stimulating Substances Mixed and Injected with Antigen**].—*Rev. Immunol.* **3.** 193-201. [Numerous refs.]

II. RAMON, G., LEMETAYER, E., & RICHOU, R. (1937). De l'activité immunisante des mélanges d'anatoxine et de substances adjuvantes. [**Immunizing Activity of Mixtures of Anatoxin and Adjuvant Substances**].—*Ibid.* 202-218. 13 tables. [Numerous refs.]

I. R. had observed that in some horses hyperimmunized with *Corynebacterium diphtheriae* anatoxin, after the high titre had been reached, a well marked and persistent rise occurred instead of a progressive fall in antitoxin content. In such animals he found inflammatory lesions at the point of injection, set up by contaminating organisms. In further experiments it was found that when tapioca was mixed with the inoculum the tapioca had an effect similar to that of the contaminating bacteria in the earlier observations ; after extensive trial the inocula used for immunizing horses against the toxins of *Corynebact. diphtheriae* and *Cl. tetani* consisted of the appropriate toxoid mixed with tapioca. For the immunization of human beings against these two toxins, the addition of T.A.B. antityphoid vaccine instead of tapioca was found more suitable. R. claims that the addition of the bacterial vaccine has an adjuvant effect on the toxoids in the production of immunity against diphtheria and tetanus.

II. The authors claim that mixtures of cholesterol and vaseline, or of lanolin and olive oil, with *Corynebact. diphtheriae* and *Cl.t.* anatoxins are more effective antigens than the toxoids alone. The addition of saponin to anatoxin also had an adjuvant effect. They found that the repeated injection, intradermally or subcutaneously, of small doses of anatoxin evoked a much better response than the injection of one large dose. They suggest that when a mixture of anatoxin and lipoid substances is injected, small amounts are released into the body gradually over a period, thus stimulating a higher degree of antitoxin formation.—C. McG.

SÉDALLIAN, P., JOURDAN, F., & CLAVEL, C. (1938). Peut-on aborder l'étude physiologiques des immunités antitoxiques ou antimicrobiennes ? (1er mémoire). [**The Physiological Study of Antibacterial and Antitoxic Immunity. I**].—*Rev. Immunol.* **4.** 211-215.

SÉDALLIAN, P., JOURDAN, F., & CLAVEL, C. (1938). La répartition des anticorps dans l'organisme immunisé (2e mémoire). [**The Distribution of Antibodies in the Immunized Organism. II**].—*Ibid.* 216-229. [Numerous refs.]

After two months of active immunization of rabbits with toxin or bacteria there was an absolutely uniform distribution of antibody throughout the cardiovascular system. To study the distribution of fixed antibody in the tissues the authors bled out immune rabbits and then perfused the vascular system with large volumes of isotonic saline to wash out all residual blood. Thereafter tissues were desiccated and known amounts were suspended in saline and tested for residual blood serum and for antibody. Apart from exudate fluid, most serum protein was found in the skin and thereafter in the liver, kidneys, subcutis and myocardium. Residual antibodies predominated in the pleura, testicles, subcutis, heart, skin and

aorta. Subsequently, citrated horse plasma was used in place of saline for perfusing; this resulted in the lungs also showing a high degree of antibody retention.

—E. J. Pullinger.

Bower, J. O., Mengle, H. A., & Paxson, N. F. (1938). **The Demonstration of Antitoxin for the Toxin of Clostridium Welchii in the Blood Serum of Patients and Dogs that have Recovered from Spreading Peritonitis Complicating Acute Perforative Appendicitis.**—*J. Immunol.* **34.** 185-193. 5 tables. [9 refs.]

Spreading peritonitis was produced in experimental dogs by ligation of the appendix and dosage with castor oil to induce early perforation. A control mortality of over 90% was reduced to less than 30% by part treatment with *Cl.w.* antitoxin. The lyophilized serum [see *V. B.* **9.** 348.] of dogs that had recovered from the disease was allowed to stand at room temperature for 329 days, and then tested for antitoxin. It was found that 1 c.c. mixed with one M.L.D. of *Cl.w.* toxin and incubated at 37°C. for 45 minutes, protected two out of three 350 g. pigeons, inoculated intramuscularly.—R. O. Muir.

Eaton, M. D. (1938). **Recent Chemical Investigations of Bacterial Toxins.**—*Bact. Revs.* **2.** 3-45. 1 table. [Numerous refs.]

In this article the subject is reviewed under three main headings, as follows :–

(1) The Production of Bacterial Toxins.—Present-day research is being directed mainly towards devising protein-free synthetic media for the production of toxins, for in such medium the toxin could easily be concentrated by differential precipitation methods. Up to the present no notable progress has been made in this direction. Other research includes the study of factors, apart from pure nutrients, which may influence toxin production. Such factors include the oxidation-reduction potential, and the presence of optimal amounts of certain "essential impurities" which occur as unavoidable ingredients of complicated media, *e.g.* copper and iron, unidentified organic stimulants, and carbon dioxide. Carbon dioxide may exert its influence by altering the pH of the medium and/or by exerting specific influence upon the metabolic processes on which toxin formation depends.

(2) Concentration and Purification of Toxin.—The aim in concentrating toxin is to reduce it to the minimum bulk possible without losing more than the smallest possible traces in the process. Methods of concentration include fractional salt precipitation—used for streptococci and staphylococci; acid or enzyme digestion methods—used for salmonella, shiga and coliform types, and alum hydroxide precipitation—used for diphtheria toxin. No toxin has yet been sufficiently purified for justifiable claims to be made regarding its chemical structure, and actually in judging the purity of toxins the available criteria are unsatisfactory. Crystallized toxins have not yet been prepared and consequently reliance has to be placed upon the attainment of a constant ratio of weight or nitrogen content to biological activity, optical rotation, molecular weight, precipitability by protein precipitating reagents, and iso-electric points. In addition, clinical and serological tests (the latter for specific proteins), may be carried out for certain anticipated impurities. Analysis by hydrolysis or digestion has yielded but little information beyond the fact that peptide linkages are essential to the activity of toxins, but this does not mean that toxins are simple polypeptide chains; in fact tryptic digestion of salmonella toxin has given rise to the suggestion that certain toxins are lipid-carbohydrate complexes.

(3) Changes Produced by Chemical and Physical Agents.—Toxins may be denatured by heat and strong acids, but certain chemicals, and in particular

formaldehyde, can modify the toxic action without affecting the toxin's combining power. This process of toxoiding has not been satisfactorily explained, and it is not even entirely certain whether the process of toxoiding is irreversible or not, since there is some evidence that if toxoiding is not yet complete the removal of formaldehyde is accompanied by a return of toxicity. Soaps also affect toxicity, probably by cloaking the toxin rather in the way that antitoxin produces a cloaking effect. Vitamin C is also claimed to affect toxin adversely, but there is much evidence to suggest that such an effect, whether appearing *in vitro* or *in vivo*, is due purely to increasing acidity.—E. J. PULLINGER.

MENKIN, V. (1938). **The Rôle of Inflammation in Immunity.**—*Physiol. Rev.* **18.** 366-418. [Numerous refs.]

Following a comprehensive definition of inflammation, a summary is given of recent advances in knowledge relating it to the broader aspects of immunity. The inflammatory reaction is regarded by M. as the physical basis of infectious processes, and thus as an immunological mechanism of definite significance. The various stages in its development are described from the introduction of an irritant until its ultimate disposal.

Interference of a live or inert agent with local protein katabolism is alleged to provoke the formation of a relatively simple crystalline polypeptide, tentatively named leukotaxine, which causes increased capillary permeability. This factor, together with an elevation of capillary pressure, produces increased fluid passage through the capillary endothelium. The localization of the irritant is accomplished by the mechanism of fixation involving the occlusion of the lymphatic drainage by a fibrinous network and thrombi. In allergic inflammation, the basic mechanism is reinforced by the presence of immune bodies. The properties of leukotaxine, recovered from exudates, suggested that it also contains a factor concerned in the chemotaxis which causes the rapid migration of polymorphs into an inflamed area. Development of a local acidosis from increased glycolysis and depletion of the alkali reserve appears to injure the polymorphs, with a resultant predominance of mononuclear macrophages when the pH falls to a level of 6·8-6·9. Further reduction in the pH proves lethal to all types of leucocytes, and frank suppuration ensues, leading to organization and repair of the affected tissue. The part played by lymphocytes and plasma cells in certain types of inflammation remains undetermined.—R. O. MUIR.

NATTAN-LARRIER, L., STEEG, L., & DUFOUR, J. (1938). Le pouvoir anticomplémentaire naturel. [**Natural Anticomplementary Power**].—*C. R. Soc. Biol. Paris.* **128.** 861-863. [5 refs.]

Maintenance at 49°C. for 45 minutes was preferred to heating to higher temperature or storage at 5°C. for destruction of complement or haemolysin in serum, since the latter methods rendered the serum anticomplementary. Horse serum, though devoid of complement, was found to have a high anticomplementary titre, and g. pig serum, rich in complement, to have little or none.—R. O. MUIR.

## DISEASES, GENERAL

PEREN, G. S., HUDSON, A. W., MORTON, A. C., & YATES, C. C. (1938). **The Economies of the Intensive Rotational Grazing of Sheep. 1st Annual Report.**—*Bull. Massey agric. Coll.* No. 9. pp. 36. 10 figs., 6 tables, 3 appendixes. [1 ref.]

It is claimed that the general health of the experimental flock was normal, and that the death rate (7%) was about the average, for the class of animal used *viz*, old ewes.

The Veterinary Department of the College was, unfortunately, unable to undertake the diagnosis of the causes of death, and so out of a total of 35 deaths no less than 16 (45·7%) are given as due to causes unknown ; but as the majority of these occurred when grazing was good and plentiful it would not appear that the mortality was in any way due to the method of feeding.—F. J. ANDREWS.

WEISNER, E. S. (1937). **Death Losses Increasing in Pullet Flocks. Fifteen Years' Mortality Records in Michigan Egg Laying Contest Show Pullet Mortality Limiting Poultry Industry.**—*Bull. Mich. agric. Exp. Sta.* No. 20. pp. 80-85. 3 tables.

The mortality rate amongst pullets at the inception of the Michigan Egg Laying Contest 15 years ago (November, 1922) was in the region of 10-15%. The average mortality rate during the eight year period ending October, 1937, was 26-53%. Breed seems to have had little influence on these figures. The most common causes of death appear to have been fowl paralysis, ruptured oviduct, peritonitis, laryngotracheitis and roup.—L. E. HUGHES.

ANON. (1938). **County Egg Laying Trials, 1937-38.** pp. 3. 2 tables. London : Ministry of Agriculture. [fcp] [Mimeographed].

The results show that the mortality rate has more than doubled since that recorded in the years 1930-1931. The mortality rate in the chief four breeds represented varied from 15·09 to 20·93%, the latter figure referring to the White Leghorn and the former to the Light Sussex varieties. Of the four principal breeds represented, the latter produced the smallest number of scoring eggs. The Rhode Island Reds had a mortality rate of 15·62% with an egg production superior to that of the White Leghorns. The chief causes of mortality are not indicated. —L. E. HUGHES.

ANON. (1938). **National Egg-Laying Test, 1936-37.**—*J. Dep. Agric. Eire.* **35.** 93-161. 2 figs. on 3 plates, 14 tables.

This is a very full report of the National Egg Laying Test, but the part of chief veterinary interest is that dealing with mortality.

During the year 68 birds died (9·6% of the flock). The deaths were confined to a comparatively small number of pens. The chief causes of mortality were ovarian diseases, parasitic infestations, gout and tuberculosis. Attention is drawn to the increase in the incidence of worm infestations and coccidiosis, which together caused almost 30% of the deaths. In previous years these parasites were relatively unimportant.

A table giving detailed results of the P.M. examinations and one giving the number and percentage of deaths for each breed are included.—J. E. WILSON.

SMITH, J. H. (1938). **Losses by Death, Depreciation, and Reduced Production in Poultry Flocks.**—*J. Minist. Agric.* **45.** 660-666. 5 tables.

S. collected information on losses in numbers and money due to deaths, sales and culling in laying flocks in Wales during the previous three years.

The death rate varied between 15% and 17%, and the culling and selling rate amounted to 32-39% of the flock. These factors were responsible for a yearly reduction of the original flock to half its size.

The relationship between deaths and sales and the causes of death and depreciation are discussed. The losses due to fall in egg production were studied, and the average productive life of the birds was found to be less than 18 months. —J. E. WILSON.

SHILLINGER, J. E. (1937). **Diseases of Fur Animals.**—*Fmrs' Bull. U.S. Dep. Agric.* No. 1777. pp. 22. 7 figs.

This is a popular publication for owners of fur farms and should serve a useful purpose. The bulletin includes sections on sanitation and disease control measures, infectious diseases, internal and external parasites, nutritional disturbances, and injuries and wounds. Under the heading " Infectious Diseases ", notes are given on distemper, the fox encephalitis due to a virus, paratyphoid sometimes accompanied by jaundice, and infectious enteritis caused by members of the salmonella group.—L. E. HUGHES.

RIDALA, V. (1938). Ueber das Vorkommen von Jungtierkrankheiten in Estland. [**Diseases of Young Animals in Estonia**].—*III. Balti. Valsty. vet. Kongr. Protokol. 1937.* pp. 81-96. [In German].

This article is mainly concerned with the diseases of young pigs, of which influenza is said to be the most common. The mortality rarely reaches 20%. An account of swine influenza is given, and a vaccine from cultures of the *Haemophilus* suspended in saline and killed by heating to 55°C. for one hour on each of two successive days is described. Various doses were given at various time intervals; apparently the dosage is not yet standardized, and results cannot yet be judged. Other infections of young pigs are described, including *coli* infections, coccidiosis, strongylosis, *Cysticercus tenuicollis*, and lungworm infestation. Numerous other minor affections are noted but not dealt with in detail, such as castration infections and avitaminosis.—P. S. WATTS.

I. GOERTTLER, V. (1938). Die allgemeine Bekämpfung der Unfruchtbarkeit der Rinder in Thüringen. [**Control of Sterility in Cattle in Thuringia**].—*Dtsch. Tierärztebl.* **5.** 378-380.

II. SCHUMANN. (1938). Das Sterilitätsbekämpfungsverfahren bei Rindern in Schlesien. [**Control of Sterility in Cattle in Silesia**].—*Ibid.* 380-382. 2 figs., 1 table.

III. EICHMANN. (1938). Planmässige Bekämpfung der übertragbaren Geschlechtskrankheiten und der Unfruchtbarkeit beim Rindvieh in den Höhengebieten der Rheinprovinz. [**Control of Contagious Genital Diseases and Sterility in Cattle in the Highlands of the Rhine Province**].—*Ibid.* 382-384. 3 tables.

IV. BOENIG. (1938). Praktische Erfahrungen in der Sterilitatätsbekämpfung bei Rindern und Stuten. [**Practical Experience in the Control of Sterility in Cows and Mares**].—*Dtsch. tierärztl. Wschr.* **46.** 705-707.

V. FRANZEN, M. (1938). Sterilitätsbekämpfungsverfahren bei Stuten und Rindern in der Landesbauernschaft Saarpfalz. [**Methods of Control of Sterility in Mares and Cows in Saarpfalz**].—*Ibid.* 707-711.

These are all administrative reports and give particulars of the organization of the work in the provinces named. The campaign against bovine sterility is on a voluntary basis.

I. Up to 1937, 75,000 animals (21% of the possible total) were enrolled. 29,600 of them were either pregnant or capable of breeding, whilst 3,000 were incapable of breeding at the time of examination and 26,400 required veterinary treatment.

The extra work thrown on the farmer, the costs of the veterinary service and the heavy secretarial work done by the organizers, are discussed.

II. In 1937 a total of 70,173 cows were examined; 14,495 required treatment, and 2,582 were found useless for breeding. Notes are given on the method of keeping records and on therapeutic technique.

III. Statistics are not given, but details of organization, treatment and charges are included.

IV. A general discussion of clinical work. Metritis was the cause of sterility in 66·5% of 13,752 cases examined in 1937.

V. This deals chiefly with mares, the control of sterility in these animals being obligatory in Germany. The work is done mostly by trained specialists who pay great attention to the clinical diagnosis of pregnancy. The control of sterility in cattle is voluntary, partly on grounds of expediency.—J. E.

RICHTER, J., & GEHRING, K. (1937). Ueber erbliche Krämpfe bei neugeborenen Kälbern. [**Congenital Tetany in Newborn Calves**].—*Berl. tierärztl. Wschr.* March 19th. 177-180. 3 figs. [Numerous refs.]

A record of three cases of generalized tetany in three calves born on a farm containing 11 cows. The tetany was intermittent and death took place on the third, seventh and eighth days respectively after birth. One calf was carefully examined P.M., but no organic abnormality was seen. The genetical history of the herd is described and the conclusion is drawn that the condition was a simple recessive semi-lethal factor.—J. E.

SAN AGUSTIN, G. (1938). **Chronic Septicemia in a Water Buffalo.**—*J. Amer. vet. med. Ass.* **93.** 264-266. 3 figs.

The author reports the symptoms lasting for a fortnight observed in a water buffalo, some of which were of a nervous type.

Three types of organism were isolated from the spinal fluid. One of these gave a bi-polar staining reaction and proved pathogenic for mice. Its pathogenicity for bovines was not tested. [This is presumably the reason for the word "septicaemia" used in the title].—L. E. HUGHES.

BLUMER, C. C., & HINDMARSH, W. L. (1938). **Dermatitis of Cattle Associated with Stomatitis and Locomotory Disturbance.**—*Aust. vet. J.* **14.** 52-55. 1 table.

This is a description of a disease of unknown aetiology which affected both beef and dairy cattle in the Northern Tablelands of N.S.W. during April and May of 1936. In eight outbreaks which were investigated the incidence varied from 5% to 22·5%. Only in one instance did deaths occur, and it was then thought to be due to exposure and severe weather during the course of the disease. The symptoms, which appeared suddenly, were anorexia, hypersalivation (due to ulceration of the buccal mucosa), nasal and ocular discharge, a stiff and stilted gait, rapid loss of condition and a varying degree of dermatitis. This latter varied from slight "scalding" and subsequent scaliness to complete exfoliation of the epidermis over considerable areas. Almost all parts of the body were affected irrespective of pigmentation. Recovery, apart from the after-effects of the dermatitis, was very rapid in most cases. Outbreaks occurred over a wide area, involving markedly different soil and pasture types. There had been scattered rains in February, in March there were dull skies and scattered showers with no severe changes; April was very dry and the pastures rapidly ripened and dried off. The disease was attributed by stock owners to various causes such as toadstools, to photosensitizing plants such as *Polygonum* and *Tribulus spp.* and to ergotized paspalum, but these factors were not consistently present in the different outbreaks.

In one instance cattle became affected after they had grazed in a limited area for some weeks, but a close examination of the paddock revealed no plant which could reasonably be suspected.—D. A. GILL.

FILMER, J. F. (1938). **Ovine Posthitis and Balano-Posthitis ("Pizzle Rot"): Some Notes on Field Investigations.**—*Aust. vet. J.* **14.** 47-52. 4 tables. [5 refs.]

Ovine posthitis is suggested as a suitable name for the disease commonly known as balanitis or "pizzle rot", since it is the prepuce which is primarily affected. Wethers can contract the disease when only a few months old; 40-90% of wethers may be affected and the disease is commoner in rams than is generally supposed. The early lesion is a small ulcer close to, but not involving, the preputial orifice. The ulcer, if unchecked, eventually surrounds the preputial orifice and extends to the mucous membrane and glans penis. F. believes the disease to be due to an infection which is favoured by the presence of urine-soaked wool. He found that the disease developed slowly, some 3-4 months elapsing before it had invaded the preputial cavity. Tests were carried out to discover a practicable method for curing the early lesions. Good results were obtained with 10% copper sulphate in vaseline, and this is now used as a routine treatment. Of 153 wethers treated with these copper sulphate ointments, 73% were cured after one treatment, 90% after two treatments and 96% after three treatments at weekly intervals. It is essential, besides clipping the surrounding wool, to remove all scab and necrotic tissue, with as little haemorrhage as possible, and to ensure that the ointment adheres to all parts of the lesion. If the preputial cavity is involved in wethers it is essential to incise it to ensure drainage and adequate treatment. When the disease affects rams early lesions can be treated as in wethers, but if the preputial cavity is involved the condition is always serious since incision is unsafe owing to subsequent distortion, which endangers the ram's usefulness. If the penis can be extended, the removal of all necrotic tissue and use of 10% copper sulphate solution is effective. If extrusion is impossible frequent douching with 5% copper sulphate is used, but such rams are usually unable to serve ewes again.

It is considered that inspection and "ringing" (*i.e.*, shearing the wool for about six inches around the preputial orifice), at three- to four-monthly intervals, of all rams and wethers, together with the segregation and treatment of cases as soon as they are found, would eliminate advanced cases, and avoid serious loss from the disease.—D. A. GILL.

NEWSON, I. E. (1938). **A Bacteriologic Study of Liver Abscesses in Cattle.**—*J. infect. Dis.* **63.** 232-233. [5 refs.]

Examination was made of 100 livers condemned at abattoirs. In smears and anaerobic cultures *Fusiformis necrophorus* was isolated from nearly all cases. Occasionally *Corynebacterium pyogenes* and a white coccus were present. It is stated that high incidence of liver abscesses in Colorado may possibly be due to the feeding of beet by-products.—S. F. BARNETT.

BARNES, J. E. (1938). **Dry Sweating in Horses.**—*Vet. Rec.* **50.** 977-979.

The disease is described as it occurs in Ceylon, and it is stated that 90% of horses recover when moved from the hot, humid atmosphere of Colombo to the more temperate climate of the hills.

Palliative treatment and the aetiology of the condition are briefly discussed. It is suggested that the disease is due to imbalance of blood salts caused by adverse climatic conditions, and it is stated that in innumerable sections made of the skin

of " dry horses ", the sweat glands appeared normal. [According to STEWART, in India, in three of his specimens, of which two were examined in Muktesar and one in Dublin, there was atrophy and degeneration of these glands—*V. B.* **9.** 261].
—F. J. ANDREWS.

SFORZA, M., & GENTILE, A. (1937). Tentativo di trasmissione e risultati di stomosinoterapie nella pleuropolmonite influenzale degli equini. [**Transmission of Equine Influenza Pectoralis and Treatment with " Stomasin "**]. —*Clin. vet., Milano.* **60.** 9-18. 10 figs. on 2 plates, 1 table.

The authors describe an outbreak of influenza pectoralis in 1928-1929, affecting 130 mules and 470 horses belonging to an artillery regiment in Padua. In March, 1935, the disease again occurred, this time in 80 out of 150 animals of the same unit. The authors, though they do not provide evidence, assume that the later outbreak was due to the virus that was latent in the system of recovered animals. They describe unsuccessful attempts to set up the disease in healthy horses by inoculation with material from the cases.—S. F. J. HODGMEN.

MEŽAKS, P. (1938). O vospalenii bymeni u korov. [**Bovine Mastitis**].—*III. Balti. Valsty. vet. Kongr. Protokol. 1937.* pp. 57-59.

Notes on the occurrence of bovine mastitis in Latvia. Infection is usually due to streptococci; tuberculous mastitis is rare. There is reference to the occasional occurrence of inflammation of the udder in new-born foals and calves, and to the appearance of lactation in young maiden heifers 6-8 months old.

KUPPUSWAMY, A. R. (1938). **Pig Rearing and Preliminary Investigation into the Existence of Swine Fever (?) in Province Wellesley.**—*Indian vet. J.* **15.** 143-186. 24 figs. on 8 plates, 3 tables, 22 charts, 1 map. [9 refs.]

A description is given of the conditions under which pigs are reared and marketed. K. carried out an investigation of the disease known in Province Wellesley (Penang, Malaya) as swine fever, which affects young pigs, from the suckling stage up to eight months of age, but rarely adults. Investigation indicated that neither S.F. nor paratyphoid of pigs was the cause in any pigs examined. Macroscopic and histological findings were those of septicaemia. Diagnosis was mainly based on clinical symptoms, P.M. lesions, age of pigs affected, mortality, and cultural, biological and histological findings. Nine young pigs, five g. pigs, two white rabbits, three white rats and one white mouse were inoculated with blood and urine of infected pigs; neither swine fever nor *Salmonella cholerae-suis* infection was demonstrated. Bacteriological investigation failed to reveal *S. cholerae-suis*, and blood smears gave negative results. Lymph node smears contained streptococci, staphylococci and Gram-negative bacilli. Faecal examination revealed ova of *Ascaris*, *Ancylostoma*, and *Trichocephalus*, and oocysts of *Eimeria deblieckí*. Ova of *Stephanurus dentatus* were demonstrated in the urine. It is stated that the disease may have been caused by dietetic errors in pigs heavily infested with helminths. Of 724 pigs infected, 26·79% recovered.—J. A. GRIFFITHS.

KITT. (1938). Neuzeitliche Anschauungen über die Kropfkrankheit. [**Recent Opinions on Goitre**].—*Münch. tierärztl. Wschr.* **89.** 241-246. [5 refs.]

Goitre can be divided into four groups :– (a) athyroidism *i.e.*, complete lack of function due to hereditary or pathological disturbances, myxoedema being present; (b) hypothyroidism of unknown cause leading to changes similar to those seen in (a), but less severe; (c) hypothyroidism associated with exophthalmic goitre, which may be due to excessive iodine intake or to individual idiosyncrasy

to normal amounts of iodine, and (d) dysthyroidism in which dysfunction of the thyroid leads to endemic goitre. Iodine is only one of the factors involved in this disease; deficiency of vitamins and heredity may play a part. The occurrence of endemic goitre in relation to iodine, geographic distribution and the radio-activity of water in various geographic formations is fully discussed.—A. T. PHILLIPSON.

CHAMBERS, F. (1936). **The Incidence of Cancer in Domestic Animals.**—*Vet. Rec.* **48.** 693-702. 4 tables. [20 refs.]

In C's experience cancer in herbivorous animals is relatively uncommon, and of the carnivorous animals, dogs are most frequently affected. In horses tumours most frequently occur in the penis and bladder, in cattle in the liver, and in dogs in the mammary glands. It has been suggested that liver tumours in cattle are due to irritation by liver flukes present. Diet would appear to have some influence on the incidence of cancer in dogs.

In a discussion on the paper there was reference to identification of neoplasms, to mouse neoplasms, and to treatment of certain neoplasms with colchicine.
—HUGH N. SPEARS.

VALADE, P. (1937). Le cancer expérimental chimique. [**Experimental Cancer Due to Carcinogenic Agents**].—*Rec. Méd. vét.* **113.** 449-469. 5 figs. [Numerous refs.]

A review of recent work on experimental cancer, with particular reference to :– (a) occupational cancer; (b) carcinogenic agents, their discovery and nature; (c) the production of experimental cancer, choice of animal, technique and the anatomy and histology of lesions produced, and (d) the relationship between carcinogenic agents and certain biological substances. A useful bibliography is appended.—GWILYM O. DAVIES.

GORER, P. A. (1938). **The Antigenic Basis of Tumour Transplantation.**—*J. Path. Bact.* **47.** 231-252. 6 tables. [Numerous refs.]

This paper is a discussion of the immunity reactions which determine the fate of transplanted neoplasms. There is some evidence that malignant cells are antigenically different from the tissues from which they arise, but under ordinary conditions of transplantation such differences do not afford a sufficient stimulus to the organism to enable it to destroy the foreign tissue. The ability to survive in the presence of antigenic differences may be a very important property of malignant cells.

Genetic evidence suggests that the stimuli determining destruction of tumour grafts are the result of iso-antigenic differences and that the substances produced will therefore be iso-antibodies.—E. G. WHITE.

WHITE, E. G. (1938). **A Suprasellar Tumour in a Dog.**—*J. Path. Bact.* **47.** 323-326. 1 text fig., 6 figs. on 3 plates. [9 refs.]

A suprasellar tumour is described in a four-year-old terrier which during life showed polyuria, lethargy and a tendency to walk in circles. The hypophysis was found at autopsy to have been completely replaced by a tumour of very diverse histological structure which was considered to be either a teratoma or a craniopharyngioma.

BENGTSON, J. S. (1938). **Primary Reticulum Cell Sarcoma of the Lymph Nodes of a Cow with Widespread Metastases.**—*Amer. J. Path.* **14.** 365-376. 6 figs. on 3 plates, 1 table. [11 refs.]

This appears to be the first record of primary reticulum cell sarcoma in cattle,

although the use of suitable histological technique would probably show the condition to be not uncommon ; many cases are probably recorded as lymphoid hyperplasia, lymphadenoma, pseudo-leucaemia, lymphocytoma, etc.

All the superficial lymph nodes, especially the suprascapular, were enlarged, greyish in colour and rather soft. There were secondary tumour deposits in the heart, intestines, uterus and skeletal muscles. No evidence of leucaemia was found in blood smears taken prior to slaughter. In histological sections prepared to show reticulum, almost every tumour cell was in direct contact with reticulum fibrils. The cells of such a sarcoma arise from the reticulum of lymph nodes and are not derived from lymphocytes.—E. G. White.

Helmer, O. M., & Clowes, G. H. A. (1937). **Effect of Fatty Acids Structure on Inhibition of Growth of Chicken Sarcoma.**—*Amer. J. Cancer.* **30.** 553-554.

The authors found that an unsaturated fatty acid fraction of pig pancreatic juice had a strong inhibitory effect on the growth of the active agent of chicken tumour I, and oleic acid was found to have a comparable inhibitory effect. The biological properties of the fatty acids and their soaps were shown to be related to their structure. The authors then attempted to discover the relationship of the chemical configuration of a series of fatty acids to their inhibitory effect on the active agent of chicken tumour I.

Fatty acids dissolved in di-sodium acid phosphate were added to an aqueous extract of desiccated tumour I prior to injection into Plymouth Rock hens. It was shown that the straight chain unsaturated fatty acids with 18 carbon atoms had a greater inhibitory effect than a comparable saturated fatty acid. Increase in the degree of un-saturation greater than that of oleic acid did not increase this inhibitory effect, which was shown to be lessened when the acids were oxidized or reduced.

The presence of the hydroxyl group lessened the inhibitory action, which varied with the length of chain, the higher members of the series showing a much higher inhibitory action than the lower members. The inhibitory effect could only be seen when the fatty acid was in the form of a soap or in the free state.—L. E. H.

I. Fenstermacher, R. (1936). **Lymphocytoma and Fowl Paralysis.**—*J. Amer. vet. med. Ass.* **88.** 600-613. 8 tables. [12 refs.]

II. Gildow, E. M., Williams, J., & Lampman, C. E. (1936). **The Transmission of Fowl Paralysis (Lymphomatosis).**—*Poult. Sci.* **15.** 244-248. 4 tables. [6 refs.]

I. The author differentiates between a neoplastic disease of fowls, which he terms " lymphocytoma ", and F.P., in which the lesions are confined to the nervous system and the eyes. Birds were bred from stock in which the incidence of lymphocytoma was high, and a number of these became affected with lymphocytoma. Several also developed F.P., but the author believes that the " virus " of the latter disease was introduced from outside sources. Heredity appeared to be a factor influencing the occurrence of both diseases.

II. The disease was readily transmissible by pen contact to chicks at all ages during the first eight weeks after hatching ; older birds were more resistant. Chicks from healthy flocks were more susceptible than those from flocks in which F.P. was present. The disease appeared to be more prevalent in birds bred from pullets than in those bred from hens, and there was evidence of a variation of inherited resistance in certain families. There was little variation in the incidence of the disease in birds reared in a confined space and in those reared on open range. The authors conclude with some recommendations for controlling the disease—*viz*, severe culling when disease appears, and the use of resistant strains of poultry for building up flocks.—Hugh N. Spears.

FITCH, L. W. N. (1938). **Fowl Leucosis: The Recognition of a Transmissible Myelogenous and Erythroleucotic Form in New Zealand.**—*N.Z. J. Sci. Tech.* **20.** 40A-49A. 9 figs. [7 refs.]

F. describes a naturally occurring case of fowl leucosis. The liver and spleen were greatly enlarged and the peritoneum covered with flattened, greyish-white nodules. Histologically the tumours and affected organs showed chiefly undifferentiated myeloblasts, which were so named because many cells failed to exhibit any indication that they would develop into granulocytes.

The disease was transmitted to six-week-old chicks by intraperitoneal inoculation of liver and spleen emulsions. The presence of erythroleucosis was also demonstrated in the inoculated birds.

A. PARSONS, L. Dorothy. (1935). **Leukaemia Coincident with and Transmissible by a Spindle-Celled Sarcoma in the Mouse.**—*J. Path. Bact.* **40.** 45-54. 1 text fig., 15 figs. on 5 plates, 2 tables. [8 refs.]

B. RASK-NIELSEN, H. C. (1936). Experimentelle undersøgelser over en transplantabel leukose hos hvide mus. [**Experimental Investigations on Transmissible Leucosis of White Mice**].—*Thesis, Copenhagen.* pp. 189. 39 figs. on 13 plates, 12 tables. [Numerous refs.] [Abst. from English summary].

C. RASK-NIELSEN, H. C., & RASK-NIELSEN, R. (1936-1938). **Further Investigations on a Transmissible Myeloid Leukosis in White Mice. I and II.**—*Acta path. microbiol. scand.* **13.** 244-262, and **15.** 169-175. 12 figs. on 2 plates, 4 tables. [Numerous refs.] [In English].

A. An account of a leucaemia in mice associated with a transmissible spindle-celled sarcoma, which originated in mice treated with a dibenzanthracene compound. The haematology of this leucaemia is described in some detail, and illustrated by some excellent plates.

The leucaemia was myeloid in character, with large numbers of pathological polymorphonuclear leucocytes. Among the cells which appeared in the circulating blood was the haemohistioblast, and P. suggests that this was the primitive cell giving rise directly to the pathological polymorphs. In this type of leucaemia in the mouse the gradation between myeloblasts and myelocytes appeared to be missing. The development of the cells seemed to be :– haemohistioblast, myeloblast, metamyelocyte, and pathological polymorphonuclear leucocyte.

B. After reviewing the literature on the subject in the first chapter of this work, the author describes in great detail his experimental results in mice when using a transmissible leucosis strain originally obtained from a mouse with tumours. The effect on the development of the disease of irradiation of the mice or their inoculation with trypanblue was studied. Complete haematological and histological examinations of most of the viscera and of the bone-marrow were also undertaken.

The histological plates at the end of the work are excellent. This thesis should be consulted in the original by those interested in the subject.

C. In part I, the authors claim to have produced a myeloid leucosis differing from those previously described by other workers in that changes occurred in the blood and bone-marrow which were not due solely to the multiplication of the inoculated myeloid cells. The only similar results are those of PARSONS [in A, above], but the leucosis described by her developed more slowly and was more in the nature of a myeloid hyperplasia than that now described, which developed from a hyper-leucocytosis to a pronounced preponderance of immature myeloid cells. The authors consider that the inoculated leucotic cells contained some agent which caused the proliferation.

Part II describes the inoculation of ten irradiated and 89 non-irradiated mice with cells obtained from myeloid leucotic material in mice killed by X-rays. It was thus hoped to demonstrate an infective agent in these cells, but the attempts failed.

Bacteriological investigation of these leucotic tumours, before treatment with X-rays, failed to reveal any organisms that might be related to the changes in the blood and bone-marrow.—D. L. HUGHES.

PANU, A., MICHAILESCO, M., & ADAMESTEANU, I. (1937). Leucemie lymphoide chronique chez le chien. [**Lymphoid Leucaemia in the Dog**].—*Arhiva vet.* **29.** No. 5. 1-11. 2 figs. [In French].

The authors describe the symptoms, treatment and lesions in a typical case of chronic lymphoid leucaemia in a five-year-old dog, and then compare the relative frequency and features of the various forms of leucaemia in animals and man. Discussing the causation, they state that the toxic and parasitic theories are not applicable to the case described, and that the possibility of an infectious origin, particularly tuberculosis, was eliminated by bacteriological examinations and animal inoculation. They consider the neoplastic theory advanced by STERNBERG, *viz*, the resumption of embryonic activity by the haemopoietic tissues, as the most plausible in this case.—GWILYM O. DAVIES.

## NUTRITION IN RELATION TO DISEASE

GREEN, H. H. (1938). **The Importance of Trace Elements in Veterinary Science.** —*Vet. Rec.* **50.** 1185-1191.

This is an annotation giving a review of trace elements of importance in animal and plant disease. It embraces copper, cobalt, manganese, zinc, boron, iodine, fluorine, selenium and molybdenum. It is not possible to give an abstract. —J. E.

I. EVANS, R. J., PHILLIPS, P. H., & HART, E. B. (1938). **Fluorine Storage in Cattle Bones.**—*J. Dairy Sci.* **21.** 81-84. 1 table. [11 refs.]

II. EVANS, R. J., & PHILLIPS, P. H. (1938). **Skeletal Storage of Fluorine in the Growing Rat Fed Bone Meals of Varying Fluorine Content.**—*Proc. Soc. exp. Biol., N.Y.* **39.** 188-191. 2 tables. [4 refs.]

I. The following average figures were obtained for the F content of bones from healthy cattle (bones not named), expressed in p.p.m. bone ash :- embryonic stage 92 ; foetus (4-9 months), 64 ; veal calves, 55 ; mature cows (reared on low F diet), 298, and bone-meal, 564. It is concluded that (a) a small amount of F passes through the placenta to the foetus, (b) the chief storage of F in the bones occurs after weaning, since while calves are being milk-fed the bone F content is relatively low, and (c) F appears to be present in appreciable quantities in the organic matrix of the bone and in cartilage.

II. Bone-meal from the metatarsals of healthy calves contained, after defatting and grinding, 20 p.p.m. F, whereas meal prepared from the bones of adult cattle contained 474 p.p.m. and two commercial samples of bone-meal similarly contained 550 and 529 p.p.m. respectively. The femurs of young rats fed for eight weeks on calf bone-meal showed a very low F content (about 44 p.p.m.) compared with those of rats fed on commercial bone-meals (average 300 p.p.m.). Some of the data obtained seemed to indicate that part of the F in calf bones was combined in such a form that it was not available for absorption and storage in the rat skeleton. —ALFRED EDEN.

ROUGET, M. (1938). La découverte de gisements phosphatés en Afrique Occidentale Française et ses répercussions possibles sur notre élevage. [**The Discovery of Phosphate Deposits in French West Africa and its Possible Effects on Animal Husbandry**].—*Bull. Serv. zootech. Epiz. A.O.F.* **1.** No. 1. 51-57.

The discovery of phosphatic deposits in the Sudan and around the Senegal basin opens up new possibilities in extending animal husbandry in these regions through the medium of improved pasturage. These deposits compare favourably in CaO and $P_2O_5$ content with the French Moroccan deposits, whilst their F content, though not specifically investigated, is certainly less than 1%. Various quotations are made from official reports amplifying the view that the stock-carrying capacity of these regions could be considerably increased by improvement of the grazing areas, since the annual rainfall is adequate and not likely to be a limiting factor. R. calls for more research into the possibility of Ca and P deficiencies in the soil in these areas, and advocates :- (a) investigation of the available CaO and $P_2O_5$ of the soil of these regions ; (b) a botanical survey with a view to pasture improvement consequent upon increased CaO and $P_2O_5$ in the soil ; (c) systematic investigation of the blood inorganic P of cattle in the supposedly deficient areas ; (d) analysis for possible harmful elements such as F in the deposits, and (e) experimental farm studies on the influence of Ca and P supplements on growth, fertility, etc. of cattle. The economics of working the deposits are discussed and a plea is made for a thorough survey of the potentialities attendant upon the discovery of these deposits.—ALFRED EDEN.

HUNGERFORD, T. G. (1937). **Mineral Deficiency and Bone Chewing in Dairy Cattle. Supply Licks and Improve the Pastures.**—*Agric. Gaz. N. S. W.* **48.** 585-587 and 590. 1 fig.

Symptoms of phosphorus deficiency, particularly bone chewing and depraved appetite, are commonly encountered among the dairy herds on the central coastal area of New South Wales. Foreign bodies ingested as a result of the depraved appetite not uncommonly result in traumatic pericarditis and peritonitis. The article gives a popular account of the matter and advice regarding the use of superphosphate top dressing and phosphatic licks.—D. A. GILL.

ARCHIBALD, J. G., KUCINSKI, K. J., BROOKE, R. O., & FREEMAN, S. L. (1938). **Nutritional Anaemia in Cattle in Southeastern Massachusetts.**—*J. Dairy Sci.* **21.** 59-68. 2 figs., 6 tables. [6 refs.]

A disease of cattle, especially young dairy stock, known locally as " neck-ail ", has been described in parts of S.E. Massachusetts and is characterized by emaciation, anorexia and, apparently, anaemia with low R.B.C. count [although no data are supplied to support this]. It appears to be related to the low Fe content of the diet, the roughage in which is somewhat lower in Fe than that from neighbouring areas where the disease is unknown. Daily oral administration of 2 oz. of approximately 5% iron ammonium citrate effected a remarkable cure and the trouble was further prevented by feeding other hays not grown in the area. In a series of pot experiments with grasses grown on the supposedly Fe-deficient soils, the Fe content of the grasses was raised, on an average, from 0·027 to 0·043% by the application of a mixed complete fertilizer plus iron (as the ammonium citrate) and this addition of Fe to the soils is suggested as an alternative method for prevention of the disease. The authors claim that this nutritional anaemia of cattle is identical with that shown in various other parts of the world (" bush sickness ", " pining ", " nakuruitis ", etc.).

[Note: The evidence on which these conclusions are based is extremely meagre. The Hb values of only four heifers were determined and these were 9·6, 8·8, 9·8 and 12·2 g.% respectively. Three of these are regarded as low, since the authors take 12·1 g.% as " normal ", but a diagnosis of anaemia on these figures is extremely unsound. Insufficient is known about the Fe level in a diet required to induce a true anaemia, but the differences between the figures for hays from " deficient " areas compared with those from " healthy " areas are so small in absolute terms as not to warrant the conclusions drawn. A slight reference is made to cobalt in a brief foot-note, inserted after the paper was written, but the authors did not seem to be aware of the extensive work that has been carried out on cobalt. They still apparently regard the nutritional anaemias of other parts of the world as Fe deficiencies, regardless of the vast amount of work that has been done to show that these diseases are anything but simple iron deficiencies. The justification, therefore, for attempting to bring " neck-ail " into line with the nutritional anaemias such as " pine ", " bush sickness ", etc., is not warranted on the very meagre evidence submitted].—ALFRED EDEN.

EDWARDS, J. T. (1937). **Carotene (or Vitamin A) Deficiency and some Common Unsoundnesses in Horses: A Comparative Review of their Possible Relationship.**—*J. R. Army vet. Cps.* **9.** 3-23 and 60-82. 24 figs. [Numerous refs.]

E. reviews the extensive literature on animal diseases arising from deficiency of carotene or vitamin A, and discusses the possible bearing of this knowledge on the aetiology of several diseased conditions in the horse. The recorded facts upon the various well recognized clinical and pathological states arising from deficiency of vitamin A in various species strongly support MITCHELL's hypothesis on the relationship between dietary deficiency, in particular deficiency of carotene, and the common unsoundness of the horse [*V. B.* **9.** 102].

The article contains numerous quotations from the literature, together with critical comments by E. Inadequate supplies of carotene in the food have been recognized as the cause of faulty hoof formation in horses in Finland [see p. 419.] and of debility in horses and mules in French Indochina [*V. B.* **4.** 626].

The well marked nervous lesions known to occur in pigs and dogs as a result of vitamin A-deficiency suggest that diseases such as shivering and roaring, where there is likewise nervous degeneration, may have a similar aetiology. In the same way, from what is known with regard to other species, infertility in horses may arise from deficiency of carotene.

The possible carotene requirements of horses are discussed in the light of GUILBERT and HART's work on cattle [*V. B.* **4.** 625.] and DUNLOP's work on pigs [*V. B.* **6.** 886]. It would appear that the daily ration for horses should contain a minimum of 15 mg. of carotene, but more adequate amounts would be supplied by the grazing of 10-16 oz. of pasture grass daily. It is pointed out that hay may often be deficient in carotene, especially where the grass has been of poor quality or badly cured, and E. comments that the above requirements are frequently not met with in many of the standard feeding rations of the horse.

Other aspects of carotene deficiency discussed are resistance to bacterial and parasitic infections, growth, and derangements in the alimentary, respiratory and urinary tracts. The possible results of such depletion in pregnant mares and in foals are discussed in relation to some of the types of unsoundness in horses scheduled under the Horse Breeding Act.—N. J. SCORGIE.

CRIMM, P. D., & SHORT, D. M. (1937). **Vitamin A Deficiency in the Dog.**—*Amer. J. Physiol.* **118.** 477-482. [Copied *verbatim* from *Physiol. Abstr.* **22.** 656. Signed M. W. GOLDBLATT].

7 dogs 1 year old, of which 6 were litter mates, were used. 2 controls were fed on vitamin A-deficient diet plus 7·2 g. cod-liver oil weekly, 4 received only vitamin A-deficient diet, and one of these 4 had 2 litters of puppies which were fed their mother's milk and the A-deficient diet. One dog was killed at the beginning of the experiment and the vitamin A of the liver determined; the vitamin A content of all livers was determined at the end of 52 weeks. The deficiency of the diet was verified by feeding the same to rats, which showed a neutrophilic index lag and a weight loss or xerophthalmia, or both, within 28-35 days. A neutrophil index lag became definitely manifest in the A-deficient dogs at 3 months and persisted to 6 months. Xerophthalmia and progressive weight loss was not observed, but early metaplasia of the bronchiolar epithelium was manifest at autopsy, together with a moderate pneumonitis. Spectrophotometric assay of the livers showed essential depletion. Of the vitamin A given in the form of cod-liver oil, 44 p.c. was recovered from the liver. After the administration of a massive dose of vitamin A to A-deficient dogs, a 3-months-old puppy absorbed and assimilated 40 times as much vitamin A in the liver as did an adult dog. The vitamin A requirement in the dog was between 157 and 330 I.U. per kg. of body weight per week, and if the requirement of vitamin A for man corresponds to that of the dog, it seems that the daily requirement for a man weighing 60 kg. would be 1,800 I.U. or approximately 2 g. of cod-liver oil.

LAHIRI, L. M. (1938). **Night Blindness and Cataract in Bullocks. (A Deficiency Disease?).**—*Indian vet. J.* **15.** 58. [See also *V. B.* **9.** 102].

Bullocks fed on a diet apparently deficient in vitamin A developed nyctalopia and cataract of one or both eyes. Their general condition, however, remained good. A supplement of green fodder to the grain ration together with a course of nux vomica cured the night blindness.—D. D. OGILVIE.

I. MEYER, J. R., PAMPLONA, A., & BUENO, P. (1937). Sobre a pretendida relação entre a "arteriosclerose hyperplastica das cobayas" e a hypovitaminose C. [**Relation between Hyperplastic Arteriosclerosis of Guinea Pigs and Hypovitaminosis-C**].—*Arch. Inst. biol. Def. agric. anim., S. Paulo.* **8.** 37-42. 16 figs. on 4 plates, 3 tables. [5 refs.] [English summary].

II. MEYER, J. R. (1937). Artefactos de fixação simulando "arteriosclerose hyperplastica" em cobayas. [**Artefacts Originating from Tissue Fixation Simulating Hyperplastic Arteriosclerosis in Guinea Pigs**].—*Ibid.* 43-46. 4 figs. on 2 plates. [English summary].

I. Thickening of the capillaries of the lungs, liver, spleen and kidneys is said to occur in normally fed g. pigs; it is most frequent in the lungs (about 80%), less frequent in the liver (38-50%), and exceptional in the spleen and kidneys. The authors point out the similarity of the lesions (hyperplastic arteriosclerosis) to those described by MENTEN and KING [(1935). *J. Nutrit.* **10.** 129-155.] in g. pigs fed with a diet insufficient in vitamin C.

II. Formalin injections were made into the trachea and heart of g. pigs; they were then killed, and fixation of the tissues was completed in 10% formalin. On examination M. found that these tissues were free from the lesions described in I, and concludes that these lesions must be artefacts.—S. TORRES.

MAREK, J., WELLMANN, O., & URBANYI, L. (1936). Neuere Beiträge zur chemischen Zusammensetzung gesunder und rhachitischen Knochen. [**Chemical Composition of Normal and Rachitic Bones**].—*Hoppe-Seyl. Z.* **240.** 208-214. [5 refs.]

Analytical data are presented for organic matter, ash, CaO, MgO and $P_2O_5$ of bone sections of the femurs of three young pigs, one normal, one rendered rachitic on a diet in which the proportion of $P_2O_5$ preponderated over CaO and MgO (E.A. minus 48), and one rendered rachitic on a diet in which these two bases preponderated over the phosphoric oxide (E.A. plus 104). Ten cross-sections representing the total length of the bone were separately analysed in each case and the data are discussed in relation to distribution of minerals and variation with diet. The authors deduce that the main mass of mineral matter in bones is not, as commonly believed, in the form of a compound resembling carb-apatite, but as a mixture of $Ca_3(PO_4)_2$ and $CaCO_3$.

[Apatite is a mineral of the general formula $(Cax)Ca_4(PO_4)_3$ where $x$ may be F, Cl, OH, or $CO_3$; carb-apatite can also be written $3Ca_3(PO_4)_2 + CaCO_3$ and fluor-apatite, the form supposed to occur in fluorosed bone in diseases such as " Darmous " could be written $3Ca_3(PO_4)_2 + CaF_2$].—H. H. GREEN.

KLEMOLA, V. (1933). Ueber keratoplastische Reaktion der Hufhornbildung durch einige physiologische Faktoren. [**The Keratoplastic Reaction of the Hoof to some Physiological Factors**].—*Biederm. Zbl. Tierernährung B.* **5.** 657-675. 18 figs., 1 table. [Numerous refs.] [English summary].

It was observed that army horses fed for months on a dry ration of oats and hay developed hoof changes characterized by general weakness, ring formation and the formation of crumbly deposits on the limbus ungulae, particularly at the heels.

Five groups of horses were used, with control groups, to test the value of supplementary foodstuffs for improving the hoof structure. The materials used were potatoes, AIV silage, natural grazing, vigantol (vitamin D) and cod liver oil respectively. Horses on natural grazing quickly improved and developed new, strong hoof horn; those on silage and those on cod liver oil also improved considerably, whilst the vigantol group showed little improvement, and the potato group none at all.—J. E.

## PUBLIC HEALTH

GEČ, M. (1938). Snabdevanje gradova mlekom u Jugoslaviji. [**How Yugoslavian Towns are Supplied with Milk**].—*Jugoslov. vet. Glasn.* **18.** 245-252.

G. discusses the milk supply of Belgrade. The population is 320,000 and the daily consumption is 72,000 litres. The milk comes from 9,000 cows belonging to 2,500 owners, mostly from the near vicinity. Though the cows are said to be healthy the hygienic conditions are unsatisfactory as to the maintenance and milking of the cows, and transport and storage of the milk. Information is given regarding the results of tests for contamination and added water.

—B. OSWALD (KRIŽEVCI).

BROWN, E. (1938). **The Tuberculosis (Attested Herds) Scheme.** *J. R. sanit. Inst.* **59.** 451-462.

The first scheme for free tuberculin testing was introduced by the Ministry of Agriculture and Fisheries in 1935. Previous to that, notwithstanding the success

of mallein in connexion with the eradication of glanders in horses, eradication o. TB. from cattle herds was considered a luxury; in the export trade its eradication by the use of the tuberculin test was a commercial factor.

The Tuberculosis Order of 1925 was introduced to safeguard the milk supply, and the Milk (Special Designations) Order (1936) encouraged milk producers to eradicate TB. from their herds. The Ministry of Agriculture's Attested Herds Scheme of 1935 was not well received, principally because no help was given to owners during the process of eradication, and after two years and four months, only 283 herds were on the register of Attested Herds in England and Wales.

Under the new scheme introduced in June, 1937, the Government contribute towards the cost of testing in herds in which there are not more than 10% reactors. The conditions are less onerous than in the earlier scheme. By April 30th, 1938, the number of herds on the register had increased to 1,350. B. considers that as the scheme develops the problem of the disposal of reactors will decrease.

—BRENNAN DEVINE.

ALLARD, E. U. (1938). L'hygiène du lait au Canada. **[Milk Hygiene in Canada].** —*Lait.* **18.** 813-822.

The history of milk hygiene in Canada is traced from its commencement in 1881 to the institution in certain areas of routine bacteriological examination of milk and veterinary examination of dairy herds in 1913. The unsatisfactory conditions under which milk was produced and handled prior to the commencement of this campaign of improvement are described in detail.

It is pointed out that inspectors must also be instructors and must be able to demonstrate to milk producers and distributors the methods of hygienic milk production and distribution.

Figures are given showing from how many herds the milk supply for Quebec is obtained, and the relative percentages sold as raw and as pasteurized milk respectively; the methods of control and inspection of herds and premises are described and discussed.—H. BURROW.

GILTNER, W. (1938). **The Training of Veterinarians for Milk Hygiene.**—*J. Amer. vet. med. Ass.* **93.** 367-371. 1 table.

The failure of the United States Public Health Service to recognize the value of veterinarians in its public health programme is commented upon. It is suggested that as the veterinarian is regarded as insufficiently trained for the control of intricate mechanical equipment used in connexion with pasteurization and distribution of milk, further training in this work should be added to the veterinary curriculum. A questionnaire to all veterinary colleges in the U.S.A. asking for information regarding facilities offered for such training is outlined and the replies are analysed at length. These replies revealed a general agreement that better facilities in this direction are needed in order that the veterinarian may be able to take over all control of dairy hygiene. The need for refresher courses open to those who have been qualified for some years is also indicated.—H. BURROW.

GRACE, L. B. A. (1938). **Thoughts on Meat Inspection Suggested by Smithfield Experience.**—*J. R. sanit. Inst.* **59.** 436-450.

The low incidence of disease found in imported meat is attributed to the efficiency of meat inspection in exporting countries, to the low incidence of disease among animals in those countries and to the effect of check-inspection in the importing country.

The problem of inspection of imported boneless beef and veal and of the determination of immaturity in veal is discussed at some length. Taints in imported meat and their origin are mentioned.

The urgent need for routine examination of poultry carcasses, especially for the presence of tuberculosis, is illustrated by figures showing the extent to which disease may be found in apparently well-nourished hens when routine examination is carried out. The condemnation of poultry carcasses affected with avian TB. is justified.

A strong plea is made for uniformity of meat inspection throughout the country, controlled either by a central authority or by grouping of local meat inspection authorities for this purpose.—H. BURROW.

KNOTH, M. (1938). Ueber bakteriologische Fleischuntersuchung bei Schweinepest. [**Bacteriological Meat Inspection for Swine Fever**].—*Z. Fleisch- u. Milchhyg.* **48.** 265-267. [17 refs.]

Under German meat inspection regulations, S.F. carcasses may be passed for human consumption after boiling or cooking, provided no *Salmonella cholerae-suis* have been found at bacteriological meat inspection. At present, however, S.F. carcasses are not always submitted to bacteriological inspection, and K. emphasizes that this should be done, as reports of this organism causing disease in human beings are received.—M. F. BENJAMIN.

LANGPAP, A. (1938). Stimmen für und gegen die Anreicherung in der bakteriologischen Fleischuntersuchung. [**Reasons For and Against Bacteriological Enrichment Methods at Meat Inspection**].—*Münch. tierärztl. Wschr.* **89.** 133-136. [13 refs.]

L. describes the method used in the Munich abattoir for the bacteriological inspection of meat. The best results are obtained by using a fluid bile-broth malachite-green medium, and incubating for six hours, sub-cultures then being made on agar plates.—M. F. BENJAMIN.

## THERAPEUTICS

WHITBY, L. (1938). **Chemotherapy of Bacterial Infections.**—*Lancet.* **235.** 1095-1103. 3 figs., 3 tables. [Numerous refs.]

The original prontosil discovered by DOMAGK is now rarely used. Its chemotherapeutic activity is to a great extent due to the reduction product sulphanilamide, which is fortunately not covered by patent rights: this has allowed of free and extensive investigation and progress, in an attempt to improve the parent substance. Three groups of substances are of interest, *viz*:– (1) those in which substitution has been made in the amino group, *e.g.* sulphamido-chrysoidine, prontosil soluble, proseptasine and soluseptasine; (2) those in which one hydrogen atom of the sulphamido group has been substituted, *e.g.*, uleron; M & B 693, etc., and (3) compounds of the sulphone type which are chemically unrelated to the sulphonamides; these exhibit activity but are toxic. Group (1) is effective against haemolytic streptococci, meningococci and gonococci; group (2) is effective against these bacteria and also against pneumococci. Activity is assessed either experimentally on mice or by clinical trial in human disease. The acute phases of serious generalized infections are the most amenable to treatment (which should be given early). There is no justification for giving a prolonged course. Toxic symptoms are, as a rule, not serious.

Sulphanilamide is rapidly absorbed, and produces an effective level in the blood, cerebrospinal fluid, tissues and fluids, and in foetal tissues in the pregnant animal. It is completely excreted in the urine in 24 hours, and the effect of one dose persists for about six hours. Treatment produces some degree of acidosis, and sulphaemoglobinaemia and methaemoglobinaemia are common. Agranulocytosis, anaemia and exfoliative dermatitis are rare. The rational use of sulphanilamide demands a bacteriological as well as a clinical diagnosis. In severe meningococcal infections it appears desirable to combine the drug with serum treatment. In Great Britain sulphanilamide is preferred to uleron, which is favoured in Germany, in the treatment of gonorrhea ; 10-20% of the patients fail to respond to the treatment. Sulphanilamide is effective in non-venereal infections of the genital-urinary system, especially with *Bact. coli* infection. It has some action against staphylococcal infections and gas gangrene, and its use in a large number of other conditions is under investigation. The benzyl compounds proseptasine and soluseptasine are less toxic and are probably of use in the less severe infections with haemolytic streptococci. Uleron tends to produce polyneuritis, and is recommended only in sulphanilamide-resistant cases of gonorrhea. M. & B 693 is effective in pneumococcal pneumonia, septicaemia and meningitis ; it appears to have an action on *Streptococcus viridans*. Its toxicity is low, but it produces cyanosis, nausea and vomiting.

Many theories have been advanced to account for the mode of action of these drugs. They are effective *in vitro* under suitable experimental conditions. They are not leucocytic stimulants and are not specifically concerned with the immunity mechanisms. Hence it would be unwise not to use them in combination with immunological therapeutic measures. There is a delay of several hours in the action of these drugs both *in vitro* and *in vivo*, and it is the multiplication of organisms which is essentially interfered with. It is suggested that these drugs block some " receptor " part of the bacterium, so that it cannot properly use essential foodstuffs. The possibility that resistant strains of bacteria may evolve is discussed.—J. M. Robson.

—. (1938). **Discussion on the Treatment of Acute Streptococcal Infections.** [Speakers :– Dyke, S. C., Layton, T. B., Kenny, Meave, Cleland, J. B., & Buttle, G. A. H.]—*Proc. R. Soc. Med.* **31.** 731-736.

This discussion was mainly on the value of sulphanilamide and the opener, Dr Dyke, stated that its value is undoubted, but that there still remains the problem of the best type of compound to use and the best method of employment. Administration by the mouth is as effective as any other method. Possible undesirable effects include sulphaemoglobinaemia, methaemoglobinaemia, pyrexia, the development of a rash, and granulocytosis; of these, only the last is very serious. The aim of treatment is not to destroy all haemolytic streptococci in the tissues of the body, but to sway the tide of battle in favour of the natural bactericidal forces in the body. Other contributors to the discussion pointed out that it had not been proved that sulphanilamide has any effect on infection in tissues as distinct from that in the blood stream, and that early bacteriological investigation, and adequate and sometimes prolonged administration of the drug, are essential.—W. J. Ironside.

Anon. (1938). **Progress in Chemotherapy.**—*Lancet.* **235.** 1245-1246. [3 refs.]

The relative merits of sulphonamide, M & B 693 and uleron as chemotherapeutic remedies are discussed. Evidence is accumulating that M & B 693 is the most promising drug in the treatment of pneumococcal pneumonia, and that it is valuable for gonorrhoea, since there is no need for treatment to be held up until

the infection has elicited a response from the bodily defence mechanism, as is the case with sulphanilamide. Some observers have failed to confirm the satisfactory results with uleron reported from Germany. M & B 693 has been used successfully in the treatment of meningococcal meningitis.—J. M. ROBSON.

ANON. (1938). **'Prontosil'. A Survey of the New Chemotherapy.** pp. 71. [Numerous refs.] London: Bayer Products Ltd. [8vo].

This publication does not lend itself to abstraction, as it is itself built up from some 200 references relating to pharmacology, toxicology and clinical experiences. —W. J. IRONSIDE.

BAUER, H., & GUNDERSON, M. F. (1938). **The Effect of Sulfanilamide on the Streptococci in the Udder of Mastitis Cows.**—*J. Bact.* **36.** 567.

Eight animals affected with mastitis were treated with doses ranging from ½ oz. to 16 oz., and it was found that the streptococcal count in the milk was reduced as long as the drug could be detected in the milk, but rose again when the milk was free from the drug.

One of the animals was infected with staphylococci, and in this animal the treatment had no effect.—W. J. IRONSIDE.

BEVAN, L. E. W. (1937). *Abortus* **Fever: Some Notes from Southern Rhodesia. Treatment of a Human Case with Prosepticine.**—*J. comp. Path.* **50.** 338-344. 1 chart. [10 refs.]

The article begins with a few notes on bovine brucellosis in Southern Rhodesia; this disease was once on the Schedule of Infectious Diseases, but was eventually removed. B. refers to a vaccine prepared from massive cultures of *Br. abortus* attenuated by exposure to chloroform, and which gave good results in some instances, but not regularly.

Human infection was once frequent in Southern Rhodesia, but the incidence has declined recently, and B. thinks that the population must have acquired an immunity, as bovine abortion is still prevalent. He describes a case of brucella infection in a child who drank unboiled milk from an infected herd while in a weak state of health after measles. After grave illness, recovery followed the administration of prosepticine.

I. LEVADITI, C., & VAISMAN, A. (1937). Chimiothérapie antiendotoxique. [**Anti-Endotoxic Chemotherapy**].—*C. R. Acad. Sci., Paris.* **205.** 1108-1110. [5 refs.]

II. LEVADITI, C., & VAISMAN, A. (1938). La chimiothérapie antiendotoxique et son mécanisme. [**The Mechanism of Anti-Endotoxic Chemotherapy**].—*C. R. Soc. Biol. Paris.* **128.** 463-465. [4 refs.]

I. The authors found that certain aromatic sulphonated derivatives, as for instance, diaminodiphenylsulphone, dioxydiphenylsulphone, diacetyldiaminodiphenylsulphoxide, and especially, 4-nitro-4′aminodiphenylsulphoxide, had a curative effect on experimental gonococcal infections in g. pigs, and that the action of the drugs was both antibacterial and anti-endotoxic.

To establish the anti-endotoxic action of 4-nitro-4′aminodiphenylsulphoxide they injected concentrated, centrifuged emulsions of killed gonococci into g. pigs intraperitoneally, and simultaneously gave the drug *per os*. They inoculated 3 mg. of dried endotoxin into five control g. pigs and into ten others which had also received 3 mg. of the drug; the controls all died within 24 hours, whereas three of the treated animals survived. In another experiment, 2 mg. of endotoxin

and 5 mg. of the drug were inoculated into 20 guinea pigs ; ten controls were all dead after two days, but 12 of the treated animals survived. In a third experiment, 1·5 mg. of endotoxin and 5 mg. of the drug were given to 20 guinea pigs ; after seven days, two controls survived out of 20, whereas 11 of the treated animals survived.

The authors conclude that the action of this and similar drugs is antibacterial and anti-endotoxic. They also found that the control mice which survived the injections of gonococci acquired an immunity, whereas the mice treated with the drug did not acquire any immunity.

II. The possibility of an action similar to that described in I has also been demonstrated in the case of the endotoxins of meningococci, *Pasteurella aviseptica*, and *Salmonella typhi-murium*. This article reports similar experiments with *Bact. shigae* and *Bact. flexneri*. The compounds used were 4 nitro-4′aminodiphenylsulphoxide, 4 nitro-4′aminodiphenylsulphone, p-aminophenylsulphamide, and the sodium salt of 4′sulphamidophenylazo-3·5-diaminobenzoic acid. Experiments similar to those described in I [p. 423] showed that 4 nitro-4′aminodiphenylsulphoxide was the most effective of the drugs used. This drug had the same effect whether it was administered subcutaneously or *per os*.

In a further series of experiments the authors found that the action of 4 nitro-4′aminodiphenylsulphoxide, p-aminophenylsulphamide, and of hydroquinone on the endotoxin of *Bact. shigae*, and of hydroquinone on the endotoxin of gonococci, was not produced *in vitro*. They conclude that these compounds are only effective after having undergone certain undefined modifications within the organism.

HOLTH, H., & RØKKE, B. (1938). Serumbehandling ved føllsyke. [**Serum Treatment of Navel-Ill in Foals**].—*Norsk VetTidsskr.* **50.** 170-175.

During the years 1933 to 1937, P.M. examinations were carried out on 44 foals, and in 65% the cause of death was navel-ill. MAGNUSSON informed H. that in an observation in Sweden 75% of 314 foals were so affected.

During the same period a Swedish brand of polyvalent joint-ill serum was tried against the disease in Norway, both as a prophylactic and a cure. In several cases the serum treatment proved beneficial, but in others it was useless.

—GUSTAV NAERLAND (OSLO).

BENESCH, F. (1938). Zur intravenösen und subkutanen Mutterblutbehandlung beim Fohlen (Fohlenlähmeprophylaxe). [**Treatment of Foals with Joint-Ill by Transfer of Maternal Blood**].—*Wien. tierärztl. Mschr.* **25.** 238-240. [1 fig.]

As a practicable clinical procedure, amounts of maternal blood up to 700 c.c. can be administered to the foal within 6-7 minutes ; the apparatus used is described.—A. T. PHILLIPSON.

MENK, W. (1937). Zur Therapie und Prophylaxe der seuchenhaften Encephalomyelitis der Pferde in Argentinien. [**Treatment and Prevention of Equine Encephalomyelitis in Argentina**].—*Festschrift Bernhard Nocht, 1937.* pp. 309-322. 3 tables. Hamburg : Friederichsen, de Gruyter & Co. [In German].

M. states that he obtained good results in the treatment of E.E. with hexamethylenetetramine. [Reports on the curative effect of this drug have been made before. There appears to be little ground for such claims].

Experiments on g. pigs and rabbits showed that these animals, which are highly susceptible to equine encephalomyelitis virus when young, were effectively

immunized by injection of the blood or serum, and still more so by injection of 1 or 2 c.c. of a formol vaccine prepared from the brains of g. pigs or rabbits experimentally infected with the virus. Immunity was established as early as ten days after injection, and it is reported that the vaccine will preserve its activity for at least seven months when kept on ice.

MARCUS, P. M., & NECHELES, H. (1938). **Treatment of Spontaneous Canine Distemper with Sulphanilamide.**—*Proc. Soc. exp. Biol., N.Y.* **38.** 385-387. 1 table. [3 refs.]

Treatment was given on the grounds that in distemper superimposed infection is more fatal than virus infection, and that in many fatal cases streptococci are the prevailing organisms present.

Sulphanilamide was given *per os* in doses of 0·33 g. thrice daily, followed up by subcutaneous injection of 100 c.c. of a 1% solution in saline, with 5-10% glucose when necessary, twice daily. Prontosil was given twice daily in intramuscular doses of 1 c.c. of a 5% solution per kg. body weight. Treatment was given when nasal discharge was observed and continued until it ceased, this period varying from 3 to 18 days. Relapses occurred when treatment was discontinued before nasal discharge had ceased.

Of 17 animals treated, 16 recovered, while only two out of 20 controls recovered.

—W. J. IRONSIDE.

—. (1938). **Discussion on Mineral Salts in Therapy.** [Speakers :– MCCANCE, R. A., AITKEN, R. S., & COPE, C. L.]—*Proc. R. Soc. Med.* **31.** 723-730. [6 refs.]

The opener of the discussion, Dr MCCANCE, dealt with the rationale underlying treatment with sodium chloride. The metabolism of sodium is closely linked with that of water. The osmotic tension of intracellular fluids is largely due to potassium salts, and that of extracellular fluids to sodium salts.

Simple removal of water from the body results in a rise in the osmotic tension of both fluids and interferes with the exchanges that take place between blood and tissues. The condition may be corrected by administration of water alone. Where sodium is removed the body may (1) excrete water and so maintain the osmotic tension of extracellular fluid, but reduce its volume, (2) maintain the volume of fluid and allow the osmotic tension to fall (sometimes seen in the rabbit), or (3) compromise between (1) and (2), which is what happens in man and most animals.

Correction of this sodium deficiency necessitates the administration of saline. Where sodium is not excreted the volume of extracellular fluid rises and causes oedema, and this is corrected by the removal of sodium. Diuretin appears to act by forcing the kidney to excrete sodium. Other speakers drew attention to the value of potassium salts in the treatment of periodic paralysis, and to the possible toxic effects of calcium chloride, potassium chloride, and salts of magnesium.

—W. J. IRONSIDE.

DE GIROLAMO, A. (1937). Tentativi di cura del farcino criptococcico mediante l'impiego del solfuro di mercurio o mercol. [**Chemotherapy of Epizootic Lymphangitis**].—*Profilassi.* **10.** 9. [2 refs.] [German summary].

The author describes the treatment, with a commercial colloidal mercury-sulphur preparation known as "Mercol", of two horses with epizootic lymphangitis (*Cryptococcus farciminosus* infection). The results were unsuccessful.—S. F. J. H.

DICKINSON, E. M., & HINSHAW, W. R. (1938). **Treatment of Infectious Sinusitis of Turkeys with Argyrol and Silver Nitrate.**—*J. Amer. vet. med. Ass.* **93.** 151-156. 1 fig., 1 table. [5 refs.]

The authors carried out trials on an extensive scale and found that treatment was effective when either 4% silver nitrate or 15% argyrol was used. They recommend that the solutions should be freshly prepared. The treatment consisted of aspiration of the contents of the sinus followed by the injection of 1 ml. of the solution. They advise treating both sinuses even if only one is affected.—W. J. I.

HELM, R. (1937). Versuche mit dem Melkgleitmittel Weidnerit-Gel zur Verhütung der Weiterverbreitung des gelben Galtes. [**The Use of the Milkers' Ointment, Weidnerit-Gel, in Preventing the Spread of Mastitis**].—*Arch. wiss. prakt. Tierheilk.* **72.** 131-141. 2 tables. [17 refs.]

An account of the use of the product on two herds of cattle. No evidence was produced concerning its value.—J. E.

FARINA, A. (1937). Saggi sull'azione svolta dal tartaro emetico e dal trattamento associato di gonacrina e tripanblau sul Tripanosoma cazalboui nei bovini della colonia Eritrea. [**Action of Tartar Emetic and of Gonacrine with Trypanblue on** *Tryp. vivax* (*cazalboui*) **in Cattle in Eritrea**].—*Azione vet.* **6.** 210-211.

F. treated calves, infected with *Tryp. vivax* (*cazalboui*), with intravenous injections of tartar emetic [details as to dosage not given]. In every case the results were negative. The injections caused a temporary disappearance of the trypanosome, but it reappeared after an interval of 8-15 days. Moreover, blood taken from a treated animal proved infective to other animals. Further treatments were carried out with injections of gonacrine plus trypanblue on animals infected with trypanosomiasis and also with rinderpest [no details as to dosage]. The results were again negative.—S. F. J. HODGMAN.

MORRELL, C. A., CHAPMAN, C. W., & ALLMARK, M. G. (1938). **On the Therapeutic Assay of Neoarsphenamine with Trypanosoma equiperdum.**—*J. Pharmacol.* **64.** 14-42. 1 fig., 5 tables. [14 refs.]

The authors describe an improved method of assaying the therapeutic potency of neoarsphenamine by means of dosage-response curves. White rats 80-120 days old were infected with two million *Trypanosoma equiperdum* each, and after 48 hours were treated with neoarsphenamine. Results were obtained five hours after injecting the drug.

The carefully standardized technique eliminates certain errors due to variation of the experimental factors. A detailed report is given of the application of the test to several commercial samples of neoarsphenamine in which the accuracy and utility of the test were demonstrated.—D. D. OGILVIE.

BINNS, H. R. (1938). **The Treatment of Canine Babesiasis with Acaprin.**—*Vet. J.* **94.** 425-429. [4 refs.]

Thirty cases of *Babesia canis* infection were treated with acaprin. Each dog received a single subcutaneous injection of 0·1 c.c. of a 0·25% solution of the drug per kg. body weight. Most cases were much improved within 24 hours, and all recovered eventually. In 17 of the dogs, characteristic symptoms of therapeutic reaction were observed 15-30 minutes after injection, but the animals were normal again within an hour. Such symptoms emphasize the narrowness of the margin between the curative and toxic doses of acaprin.—D. D. OGILVIE.

O'Gorman, C. L. (1938). **Repeated Arsenical Dipping of Sheep.**—*Aust. vet. J.* **14.** 68-69.

In a district where repeated dipping of sheep at 14-day intervals in a solution of 8 lb. arsenious oxide to 400 gallons of water was necessitated through regulations concerning eradication of the cattle tick (*Boophilus australis*), it was found that no harm resulted to the sheep. Sheep of all ages were dipped, from lambs one week old upwards. There was apparently no adverse effect upon the wool.—D. A. Gill.

Roberts, F. H. S., & Legg, J. (1938). **Nicotine Sulphate : Its Use in the Treatment of Cattle Lice.** (*Haematopinus eurysternus* **Nitzsch**).—*Aust. vet. J.* **14.** 58-60. 1 table.

Nicotine sulphate at the rate of 5 ml. of a 40% solution per gallon of water was very effective against *H.e.*, practically all the lice being destroyed. Lice were killed soon after being wetted with the spray, and the only survivors were those hidden in folds of skin. This treatment was not very efficient against the eggs, and it appears necessary to repeat treatment after 14 days to effect complete eradication. The treatment was harmless to the animal whether in shade or exposed to sunlight. Owing to its cost, however, its use will probably be limited to dairy cattle and stud animals. Certain difficulties in treatment of herd animals in large numbers out in the open are discussed.—H. McL. Gordon.

Graham, N. P. H. (1937). **Observations on the Enema Treatment for Oesophagostomum columbianum.**—*Aust. vet. J.* **13.** 252-254. [2 refs.]

A field trial indicating the efficacy of the enema treatment against *O.c.* is briefly described. Treatment was carried out in early winter and sheep were then placed in paddocks which had not recently been used for sheep.—H. McL. Gordon.

Petrov, A. M., & Gajbov, A. D. (1937). Opyty profilaktičeskoĭ (preimaginaljnoĭ) degeljmintizacii krupnogo rogatogo skota pri teljazioze. [**Prophylactic Anthelmintic Treatment of Cattle against Thelazia**].—*Sovyet. Vet.* No. 4. pp. 58-61.

Observations in Azerbaijan and elsewhere showed that infection of the conjunctiva of cattle by *Thelazia rhodesi* is seasonal, being absent in March, April, and May, and beginning in June ; in August and September the incidence rises until it is nearly 100%. Irrigating the eye with a 3% boric acid solution on a single occasion in July had little effect ; repeated a month later it is said to have reduced the infection by 63%, and repeated in the third month it reduced the infection by 85%. The authors consider that three such treatments, beginning in June, should be adopted as a routine measure for affected cattle.

Davis, G. K., & Maynard, L. A. (1938). **Cod-Liver Oil Tolerance in Calves.**—*J. Dairy Sci.* **21.** 143-152. 2 tables. [14 refs.]

Dairy calves were reared from birth on skim milk, hay and a concentrate mixture, with cod liver oil added at various levels up to 0·7 g. per kg. body weight. These calves were killed off at 6 or 9 months of age and examined for gross and microscopical lesions. The cod liver oil when at the highest levels did not adversely affect growth or physical condition, and the same results were obtained when the experiment was repeated using a poorer quality of hay. Slight dystrophic changes were found in some of the animals on histological examination of the muscles, principally in those animals which had received the highest amount of cod liver oil feeding, but these lesions were of a very minor character. The results suggest that cod liver oil, as an adequate source of vitamins A and D, can be fed to calves

without producing any appreciable injury, in contrast to previous findings that cod liver oil fed to sheep and goats at similar levels resulted in death accompanied by wide-spread and severe lesions.—ALFRED EDEN.

FOGGIE, A. (1938). **A Note on the Treatment of Fowl Paralysis by Wheat Germ Oil.**—*Vet. Rec.* **50.** 1594.

Fifty chickens of a flock of 96, in which F.P. had been diagnosed, were given four injections of wheat germ oil at intervals of a week. Subsequently 16·3% died of fowl paralysis, while 8·7% of untreated animals of the flock died.—D. D. O.

## POISONS AND POISONING

DANCKWORTT, P. W., & GABEL, W. (1937). Porphyrinuntersuchungen im tierischen Harn zum frühzeitigen Erkennen von Bleivergiftungen. [**Tests for Porphyrinuria for Early Diagnosis of Lead Poisoning**].—*Dtsch. tierärztl. Wschr.* **45.** 605-606.

In 1929, the authors' department, the Chemical Institute at Hanover Veterinary College, was requested by the German government to investigate all possible cases of lead poisoning in animals in Germany. As part of this work a method of early diagnosis was evolved, based on the detection of coproporphyrin III in the urine. 100 c.c. of urine are made acid by the addition of acetic acid, extracted with ether, the ethereal layer washed with water, and the contained porphyrin extracted with ·5% HCl. The strength of red fluorescence emitted by the porphyrin in the HCl on exposure to ultra-violet light is then estimated in a Pulfrich photometer.

In this way the normal porphyrin content of equine urine was determined as $6{\cdot}3\gamma$ ($6{\cdot}3 \times 10^{-6}$ g.) per 100 c.c. Only one case of lead poisoning has as yet been investigated in this way: a horse with "slight but acute" lead poisoning gave twice the above figure.—J. E.

SEEKLES, L., & SJOLLEMA, B. (1937). Der Einfluss neuro-vegetativer Gifte auf die Herzwirkung des Rindes. II. Mitteilung. Das K/Ca-Verhältnis des Blutserums im Zusammenhang mit dem neuro-vegetativen Zustand im Herzen. [**The Effect of Sympathetic Nervous Poisons on the Heart Action of Cattle. II. The Connexion between the Potassium-Calcium Content of the Blood and the Sympathetic Nervous Condition of the Heart**].—*Arch. wiss. prakt. Tierheilk.* **72.** 191-194. 1 fig., 2 tables. [5 refs.]

SEEKLES, L. (1937). Der Einfluss neuro-vegetativer Gifte auf die Herzwirkung des Rindes. III. Mitteilung. Die Wirkung des Pilocarpins, Physostigmins, Atropins, Ergotamins und Pituglandols bei normalen Kühen und Kälbern. [**The Effect of Sympathetic Nervous Poisons on the Heart Action of Cattle. III. The Action of Pilocarpin, Physostigmin, Atropin, Ergotamin and Pituglandol on Normal Cows and Calves**].—*Ibid.* 195-203. 4 figs. [See also *V. B.* **8.** 808].

II. Investigations were carried out on cattle (normal, gravid, hypocalcaemic and hypercalcaemic) to ascertain possible relationships between the K/Ca ratio in blood serum and the tonus of the autonomic nervous system, particularly in relation to cardiac effects. In general high K/Ca values were associated with increased parasympathetic tone, but no absolute correlation could be observed.

III. The cardiac effect of drugs affecting the autonomic system—adrenalin, pilocarpine, physostigmin (eserine), atropine, ergotamin and pituglandol—was studied on cattle. The conclusion is drawn that the autonomic relationships are

quantitatively, and probably qualitatively, different in the bovine as compared with the human subject. Intravenous injections of 50-750 mg. of pilocarpine produced no reduction of cardiac frequency in adult cattle. Small doses of eserine sulphate produced slight lowering of frequency, probably attributable to parasympathetic stimulation; larger doses had little effect although respiratory symptoms (dyspnoea) were shown; very large doses aggravated these symptoms with considerable increase in heart frequency. High doses of atropine increased frequency with accompanying respiratory symptoms. The effects of ergotamin tartrate suggested a relative increase of sympathetic tonus and decrease of parasympathetic. Pituglandol effected prolonged depression of cardiac frequency, suggesting paralysis of both innervation systems.—H. H. Green.

Moxon, A. L. (1938). **The Effect of Arsenic on the Toxicity of Seleniferous Grains.**—*Science.* **88.** 81. [5 refs.]

Previous investigations had shown that in comparing the relative toxicities of such elements as Se, Te, As, V, Ni, W and Mo, only Se at the concentrations employed caused severe liver lesions in rats. More recent work has shown that feeding As along with seleniferous grains (containing organically combined Se) prevents the characteristic symptoms and lesions in rats and this protective action applies equally to inorganic Se salts. Naturally, the feeding of As to livestock as a protection against Se poisoning is not recommended on the basis of these findings, but the favourable results obtained with As have stimulated the search for other, non-toxic, elements or compounds which will similarly act protectively, and certain such compounds have already given promising results.—Alfred Eden.

Hanlon, G. (1938). **Creosote Poisoning of Cattle.**—*Aust. vet. J.* **14.** 73. [1 ref.]

H. investigated losses amongst cattle occurring in a small paddock in which electric light poles had been recently erected. Creosote had been applied to the poles while they were lying on the ground and was re-applied to them after erection. Symptoms were rapid respirations, evidence of burning on the mouth, contracted pupils and blackened faeces. There was great thirst and pain. Autopsy performed on an advanced case showed the abomasum to contain a black, oily substance which was also present throughout the intestine, accompanied by an acute gastro-enteritis.
—D. A. Gill.

Webb, J. L. (1938). **Grass-Sickness may be Matricariasis Equorum. [Correspondence].**—*Vet. Rec.* **50.** 1129-1130.

W. suggests that grass sickness may be intoxication by *Matricaria suaveolens*, which he noticed was abundant on Scottish farms where the disease occurs. He was struck with the similarity between the symptoms of grass sickness and those of *M. nigelaefolia* poisoning of cattle in South Africa.—J. E.

Nadaud, M. (1938). L'acide cyanhydrique dans les plantes fourragères. Étude chimique et toxicologique. [**Chemical and Toxicological Study of Hydrocyanic Acid in Forage Plants**].—*Thesis, Toulouse.* pp. 91. 1 fig., 2 tables, 3 charts. [Numerous refs.]

This study is divided into three sections :–

(1) The classical work dealing with the discovery of HCN, and the hypotheses on its origin in plants. HCN seldom exists in a free state in the vegetable kingdom, but usually in the form of a glucoside from which it may arise in the normal or abnormal metabolism of the plant.

(2) The methods adopted for the qualitative and quantitative determination of HCN. The author used picro-sodium papers for qualitative detection.

(3) A review of the published work on cyanogenetic plants together with N's own results on HCN estimation in forage plants of the orders Leguminosae and Gramineae.

The majority of the plants studied do not contain HCN in sufficient amounts to cause any trouble to animals eating them. Some plants, however, including white clover (*Trifolium repens*), cultivated vetch (*Vicia sativa*), lotus (*L. corniculatus*), sorghum (*S. vulgare*) and blue grass (*Molinia coerulea*) may at certain stages of growth contain significant amounts, which under certain circumstances may prove dangerous to animals. Whilst HCN is present in small amounts in the male inflorescence of maize, N. asserts, on the strength of evidence he collected, that the depression in milk yield which often follows the feeding of large amounts of maize cannot be attributed to its HCN content.—N. J. SCORGIE.

SCHWERDT. (1936). Erkrankungen mit Todesfällen bei Schweinen durch Verfütterung von türkischen Erbsen? [**Deaths in Pigs Fed on** *Vicia ervilia*].—*Berl. tierärztl. Wschr.* **52.** 767.

A report of sudden deaths in half-grown pigs fed on a mixture containing about 5% of the vetch, *V.e.* In a discussion of the toxicology it was stated that HCN was not involved, and that the true nature of the toxic principle is unknown.
—J. E.

EARLE, K. V. (1938). **Toxic Effects of** *Hippomane mancinella.—Trans. R. Soc. trop. Med. Hyg.* **32.** 363-370. 2 plates. [20 refs.]

A botanical description is given of *H.m.* (the manchineel tree) which is distributed along the coast-line of parts of South America, Central America and the West Indies, and which contains an active and toxic principle in the latex in the form of a resin, insoluble in ether and alcohol. Among the toxic symptoms caused in man and animals are included irritation and vesicle formation of the epidermis and genitalia, conjunctivitis, irritation of the gastro-intestinal tract, leading to colic, bloody diarrhoea, and inflammation of the respiratory tract; fatal results sometimes follow. Possible allergic reactions are discussed, but more research is required into these aspects, and suggestions are made for the prevention of accidental poisoning.—ALFRED EDEN.

## PHYSIOLOGY

RATHNOW, H. D. (1938). Ueber das Verhalten des Eisens der Nahrung während der Pansenverdauung des Schafes. [**The Role of Iron during Rumen Digestion in Sheep**].—*Inaug. Diss., Munich.* pp. 31. 11 tables. [Num. refs.]

The object of this work was to determine the fate of the iron of the food during the course of digestion in the rumen, and to find whether the iron content of the rumen ingesta indicates the rate of digestion. The iron and nitrogen contents of the dry matter and liquid filtrates of the rumen ingesta were estimated at 3-, 6- and 9-hour intervals after a feed of hay. The rumen content became very much diluted during the course of the nine hours' digestion: the iron and nitrogen contents of the dry matter showed a consistent rise; the iron content of the filtrates remained constant, indicating that no iron was going into solution, but the nitrogen content showed a tendency to rise; this may have been due to the nitrogen content of the saliva and/or to nitrogen going into solution.

The rise of the iron content of the rumen dry matter serves as a good indication of the rate of digestion; it is estimated by this means that in 3 hours 32·1%, in 6 hours 48·5%, and in 9 hours 58·8% of the dry matter of the rumen is digested.
—A. T. PHILLIPSON.

WATZKA, M. (1938). Schilddrüsenveränderungen unter Temperatureinflüssen. [**Changes in the Thyroid due to Temperature**].—*Tierärztl. Mitt.* **19.** 323-325. 4 figs.

During the summer the thyroid contains large follicles filled with colloidal material rich in thyroxin which are bounded by a thin layer of secretory cells. In winter the cells enlarge and the follicles almost entirely disappear. This winter change is not observed in animals which hibernate, yet in a hedgehog kept in a cold room during winter without hibernating the active type of winter thyroid was observed. Foetuses *in utero* and birds in the egg have the summer type of thyroid ; the winter type of active thyroid develops rapidly immediately after birth.

The activity of the thyroid apparently depends on the temperature in which the animal lives. If this is high, the thyroid becomes less active and secretes largely into the follicles ; the rate of metabolism is decreased and the body produces less heat. If the temperature of the habitat is low, the reverse occurs. During hibernation the rate of metabolism is low, as indicated by the existence of the summer type of thyroid. In the case of the hedgehog mentioned above the necessity of maintaining a normal rate of metabolism, together with normal body temperature in cold surroundings, was met by an increase in activity of the thyroid.—A. T. P.

STEGER, G. (1938). Zur Biologie der Milz der Haussäugetiere. [**Biology of the Spleen of Domestic Mammals**].—*Dtsch. tierärztl. Wschr.* **46.** 609-614. 2 figs. [7 refs.]

The size of the spleen in proportion to the body and the amount of muscle in the capsule and trabeculae appear to determine the amount of blood which the spleen can store. The spleen of young animals is proportionally larger than that of old animals ; carnivores have relatively larger spleens than herbivores, with the exception of the horse, while race horses have larger spleens than other horses. The proportion of contractile tissue in domestic animals rises in the following order :– cow, pig, sheep, cat, dog and horse.

The proportion of white pulp to contractile tissues measured in volumes % in the domestic animals is as follows :– horse, 4·29 to 19·8 ; cow, 20·27 to 5·10 ; sheep, 23·73 to 6·9 ; pig, 10·66 to 6·40 ; dog, 3·01 to 16·73 ; cat, 8·38 to 6·99, and rabbit 35·23 to 1·01. The question of the spleen having endocrine activity is considered. Experiments are quoted connecting the spleen with tissue respiration (" respiratorische Stoffwechsel "), the respiratory centre, the coagulation time of the blood, and digestion in the stomach and intestines. The article deals also with the recognized anatomy and physiology of the spleen.—A. T. PHILLIPSON.

HAYDEN, C. E. (1938). **Changes in the Blood of the Cow at Parturition.**—*Cornell Vet.* **28.** 152-160. 6 tables. [14 refs.]

The inorganic, lipoid, total acid-soluble, and total P values of the serum obtained from 11 cows shortly after parturition showed very little deviation from similar data obtained from eight normal non-pregnant cows. The work of others is reviewed and indicates that Ca and inorganic P tend to fall slightly at parturition, an observation not substantiated by the results presented in this paper. [It should be noted that the samples analysed here were obtained, some a few hours, and some 1-2 days, after parturition, and none actually just before or at parturition, so that the data are not strictly comparable with others reviewed in the literature].

In eight cases of milk fever all the P partitions were lower than normal, while the highest serum Mg figure obtained from any case of milk fever was 3·81 mg. %, being 9% higher than the high normal of 3·5 mg. % as given by EVELETH [*V. B.* **8.** 181].—R. ALLCROFT.

SUTLIĆ, A. (1938). Sadržaj karbamida u krvi svinja. **[Blood Urea in Pigs].**—*Vet. Arhiv.* **8.** 592-593. [1 ref.] [German summary].

The urea content of the blood of 100 pigs was estimated by the Hüfner-Ambard-Hallion method using the Kowarski urometer. The average was 9,864 mg. % and the highest 31,972 mg. %. There was no evidence of any connexion between the blood urea content and the amount of fat present.—B. OSWALD (KRIŽEVCI).

VARIĆAK, T. D. (1938). Zur Kenntnis des Markes der Rumpfknochen Untersuchungen zwecks klinischer Auswertung an Pferd, Rind, Schwein, Hund und Katze. **[The Marrow of the Bones of the Trunk in Horses, Cattle, Swine, Dogs and Cats].**—*Arch. wiss. prakt. Tierheilk.* **73.** 461-475. 4 figs. [Numerous refs.]

The vertebrae and sternum of 100 horses were examined for the distribution of red and yellow marrow. From the results, the impression was obtained that yellow marrow appears late in life but there was no definite age factor that could be connected with distribution. In horses under eight years old no yellow marrow was found, and in older horses there was great variation in the amounts of red and yellow marrow.

Three hundred cattle were examined in the same way. In calves no yellow marrow could be found; in animals 12-18 months old a great deal of yellow marrow was present, but its distribution was irregular.

Five hundred pigs were examined; about two thirds were under one year old and one third 1-2 years old. In all the animals a great deal of fat was present in the marrow, but histological examination revealed the existence of blood-forming tissues in the fatty areas. This was not the case with horses and cattle.—A. T. P.

ANDERSON, J., & DAUBNEY, R. (1938). **Artificial Insemination of Cattle and Sheep in Kenya.**—*Emp. J. exp. Agric.* **6.** 193-205. 5 figs. on 1 plate, 2 tables. [Numerous refs.]

The work recorded here was undertaken in the first place largely because it was found that many bulls were sterile and that contagious granular vaginitis was of common occurrence in cows. Full details are given of the method employed, which consisted in (1) collection of the sperm from the male by means of an artificial vagina, (2) microscopic examination, and dilution of the sperm, and (3) injection of the sperm into the cervix of the female. Tables and results show that the procedure was successful in 299 out of 443 cows, and in 3,040 out of 5,742 ewes.
—W. J. IRONSIDE.

BØE, F. (1938). **Studies on Prolonged Pregnancy in Rats.**—*Acta path. microbiol. scand.* Suppl. No. 36. pp. 146. 26 figs., 27 tables. [Numerous refs.] [In English: French and German summaries].

This monograph gives the detailed results of experiments on prolongation of pregnancy in rats carried out during 1936 and 1937 at the University Pharmacological Institute, Oslo. It is known that administration of various hormones at suitable periods will retard pregnancy in rats, leading to expulsion of dead or macerated foetuses, or that parturition may not take place at all, and the animals may die undelivered. The following procedures were used by the author :– (a) administration of gonadotropic hormones from the serum of pregnant mares and from the urine of pregnant women, and also of pure oestrone benzoate and synthetic progesterone; (b) mechanical occlusion of the uterine horns, and (c) hypophysectomy. These were applied during the latter third of pregnancy and their effects noted in detail :– (1) in protracting the period of parturition; (2) on

the foetal weight and the fate of the foetuses *in utero*; (3) on the weight of the placentas; (4) on the gain in weight of the experimental animals, and (5) on the weights of the endocrine organs of dams and foetuses. Throughout the experiment adequate controls were used.

Whilst it is impossible to deal with the findings adequately in the short space of this review, it may be said that in general the effect of all these procedures was to prolong the period of pregnancy and occasionally to inhibit parturition completely. Foetal development was usually inhibited, though in the experiments with the gonatropic hormone from the urine of pregnant women and with progesterone there was an increase in foetal weight. The procedures used had no distinct effect on the weight of the placenta, whilst the gain in weight of the experimental animals was parallel to the foetal development. The effect on the endocrine organs was variable.

From his results the author concludes that the effect on the foetal development of the two types of gonadotropic hormone may be completely explained by the assumption of a secondary production of ovarian hormones. The intra-uterine death of the foetuses during prolonged pregnancy is thought to be due to the cessation of placental junction towards term. The changes in the endocrine organs seem to be caused by the slow death of the foetuses *in utero*.

A tremendous amount of interesting and detailed experimental work has been recorded, but the investigation appears to have thrown little light on the physiology of the initiation of parturition. The literature on the subject is well reviewed and an adequate bibliography is included, whilst the reproduction of both text and figures is all that could be desired.—A. Robertson.

Newton, W. H. (1938). **Hormones and the Placenta.**—*Physiol. Rev.* **18.** 419-446. [Numerous refs.]

It is now more or less taken for granted that the placenta is an endocrine organ, but its function, except in the most general terms, is not yet understood. N. reviews the relevant facts in the literature dealing with placental hormones and his conclusion are that :– (1) the evidence indicates that the placenta can produce oestrone, but that the possibility of its production from sources outside the genital tract, *e.g.* the hypertrophied foetal gonads in the pregnant mare, cannot be excluded; (2) the evidence in regard to the placenta as a source of progestin is so scanty that no conclusions are possible, and (3) in regard to gonadotropic principles, it is widely accepted that those of the placenta, blood and urine in pregnancy are identical, and differ in their action from anterior pituitary extract in that they contain only the luteinizing and not both the follicle-stimulating and luteinizing principles. N., however, doubts whether the matter is as simple as this, since considerable confusion has arisen from the fact that the action of anterior pituitary extracts varies with the animals from which they were obtained and with the test animals employed. The article concludes with a general consideration of the hormonal function of the placenta during pregnancy.—N. J. Scorgie.

## TECHNIQUE AND APPARATUS

Söldner, I. (1937). Vergleichende Hämoglobinbestimmungen am Blut verschiedener Haustiere. [**Haemoglobin Content of the Blood of Domestic Animals**]. —*Inaug. Diss., Munich.* pp. 32. 12 tables. [Numerous refs.]

S. compares various methods of estimating the haemoglobin content of the blood. The Autenrieth, the Hellige-ortho and the Hellige-normal haemoglobinometers, and three sizes of the Burker haemoglobinometer were used. The

Autenrieth and the Hellige-ortho proved to be the easiest instruments to read. The values given by the Burker and the Autenrieth haemometers were higher than those of the others. The Burker types have given very exact results with human blood, but S. considers that the Autenrieth is best for comparative work on the blood of animals.

The number of animals examined was too small for any conclusions to be drawn regarding the influence of breed, age, and state of nutrition on the erythrocyte count and haemoglobin content of the blood. The values found lay within the limits of those of other workers, with the exception of those for cattle, in which slightly higher values were obtained.—A. T. PHILLIPSON.

ROOS, J., & KOOPMANS, S. (1938). **Studies on the So-Called Electrical Stunning of Animals. Effect of the Intermittent Constant Current.**—*Vet. J.* **94.** 376-388. 12 figs. on 4 plates, 4 tables. [18 refs.]

A review is given of experiments on the effect of electrical currents as anaesthetizing agents in man and animals. The view is expressed that the effect is one of motor inhibition rather than anaesthesia.

Details are given of the authors' experiments on cats, goats and pigs, using 70 volt currents of varying amperages (70-300 mA): the apparatus and methods employed are explained in detail and the effects produced are analysed and compared as they occur in the three species and in relation to the use of intermittent, direct and alternating currents respectively.

The significance of the eyelid reflex is discussed with special reference to the effect of the strength of the current and time of passage on the period of absence of this reflex.

It is concluded that the effect of electrical "stunning" is not to induce unconsciousness or to render the animal insensible to painful stimuli, but rather to render it incapable of exhibiting objective symptoms of pain.—H. BURROW.

HEINEMAN, P. G. (1938). **Critical Review of Methods for the Evaluation of Antiseptics.**—*Arch. Path.* **26.** 320-326. [1 ref.]

Attention is called to potential sources of error in certain of the methods used for the evaluation of antiseptics. Various new methods which have been used by H. for some years are described and several of these are recommended for general use provisionally in the absence of official standard methods. The need for uniform methods of standardization is emphasized so that determinations carried out in different laboratories may yield comparable results.—ALFRED EDEN.

## MISCELLANEOUS

TURNER, Helen N. (1938). **Statistics for the Veterinarian. II.**—*Aust. vet. J.* **14.** 2-11 and 60-67. 12 tables. [12 refs.] [See also *V. B.* **7.** 306].

This is a continuation of a study dealing with the application of statistical methods to experiments likely to be carried out by veterinarians and others. It is unsatisfactory to attempt an abstract of this article; the numerous formulae and tables must be consulted in order to appreciate the study. It deals with qualitative data and includes detailed observations on definitions and first principles of probability, criteria to be satisfied, proportions, and the $X^2$ test. These aspects are illustrated by data from typical experiments. The series is to be concluded.

—H. McL. GORDON.

FELDMAN, W. H. (1938). **The Role of Pathologist in Diseases of Poultry.**—*J. Amer. vet. med. Ass.* **93.** 15-18.

A general article, with no new information.—J. E. WILSON.

I. VON OSTERTAG, R. (1938). Ueber unsere Kolonien und den kolonialen Veterinärdienst, insbesondere in den zur Zeit unter Mandat stehenden Kolonien Deutsch-Südwestafrika und Deutsch-Ostafrika. [**The Former German Colonies and Veterinary Services Therein**].—*Dtsch. tierärztl. Wschr.* **46.** 65-71.

II. KNUTH, P. (1938). Ueber meine Studienreise nach Afrika in den Jahren 1906 und 1907. [**My Study Tour in Africa in 1906 and 1907**].—*Berl. tierärztl. Wschr.* Jan. 7th. 14-16, Jan. 14th. 30-32, and Jan. 21st. 43-44.

III. LICHTENHELD. (1938). Erinnerungen an meine Tätigkeit in Deutsch-Ostafrika. [**Veterinary Reminiscences from Former German East Africa**]. —*Ibid.* Feb. 18th. 106-107, and Feb. 25th. 118-119. 12 figs.

IV. KNUTH, P. (1938). Ueber die heutige Organisation des Veterinärwesens und den Stand der Tierseuchen im Tanganyika Territory (ehemaliges Deutsch-Ostafrika). [**Veterinary Organization and Animal Diseases in Tanganyika**].—*Ibid.* April 15th. 223-226. 3 tables, 1 map. [4 refs.]

I. The veterinary history of German South-West Africa began in 1894 when Dr RICKMANN was in charge of veterinary work there. He eradicated contagious bovine pleuro-pneumonia before 1900.

In 1910, the author was sent out to cope with a serious sheep disease, which he identified as sheep pox. The infection had been brought in on Karakul sheep from Persia and it was controlled by vaccination and segregation. Other diseases present at the time included glanders, African horse-sickness, sheep scab, mange in horses and goats, and bluetongue of sheep, besides the other well known enzootic infections. The first veterinary laboratory was set up on Dr RICKMANN's recommendation at Gammams, near Windhoek.

In 1913, the author was sent to German East Africa to lead rinderpest control. His travels are described, and notes are given on other diseases.

II. This is an interesting account of K's travels to England, France, Egypt and to the British and German colonial territories of east, south and west Africa. He had been appointed as the first Director of the new Tropical Department of the Hygiene Institute of Berlin veterinary school in 1906, and this study tour was his first duty. He relates many points of historical scientific interest in connexion with veterinary research, and refers to people he met, so that the report is of much biographical interest.

III. An interesting personal account of veterinary affairs in German East Africa between 1905 and 1914, during which period the veterinary service grew from two to 23 persons.

A veterinary institute for rinderpest control was founded at Mpwapwa about the year 1913, being in charge of Dr WOELFEL, while L. was head of the veterinary service.

IV. This is a rather detailed abstract of the veterinary report of Tanganyika for 1935, with footnotes on certain matters on which Germans also have worked. —J. E.

MANUSARDI, L. (1938). Appunti di patologia veterinaria in A.O. [**Veterinary Pathological Notes from East Africa**].—*Azione vet.* **7.** 627-629. [12 refs.]

M. gives a series of discursive notes on points of veterinary interest observed by himself in connexion with the horses and camels employed in the Abyssinian

campaign. He discusses the type of horse required for the work and says that all requisites were found in the Berber Arab. These horses were all entires, whereas the Abyssinian horses employed were usually geldings. He hazards the opinion that, apart from all other considerations, the gelding of horses weakens their powers of resistance to disease. The greatest nuisance was the common tick [genus not given]. He gives a few scattered notes on forms of mange and dermoid cysts in camels, and the methods of treatment employed by native camel men.—S. F. J. H.

GIRARDON, C. A. (1938). Per il potenziamento dell'Impero Guardie veterinaire indigne dell'Eritrea. [**The Eritrean Native Veterinary Guards**].—*Azione vet.* **7.** 543-545. 1 fig.

The enlistment of a body of native Abyssinians in veterinary patrols was started in 1935. The sanctioned numbers are 100 men, including 72 privates, 20 under-officers and eight superior officers in two grades. Enrolment was apparently not complete at the time of publication of this article. The enrolment was placed in the hands of the Divisional Commissioners, the idea being to employ men drawn from the regions in which they would have to work. Details are given as to uniform and equipment. The men employed in the lowlands are mounted on camels; those on the higher plateau may be on foot or mounted on mules.

All the men attend a course of instruction at the Serum-Vaccine Institute, Asmara. Their duties are to inspect flocks and herds, report breaches of regulations and outbreaks of contagious diseases, arrange for the isolation of centres of infection, and generally to enforce orders issued by the Veterinary Corps.—S. F. J. H.

BRAILA, J., & CERNAIANU, C. (1938). L'organisation des laboratoires régionaux de bactériologie vétérinaire. [**Organization of Regional Veterinary Bacteriological Laboratories**].—*Bull. Off. internat. Epiz.* **16.** 195-204. Discussion pp. 370-376.

As a result of experience gained in Rumania, the authors are convinced that an efficient State Veterinary service must have regional laboratories in direct touch with a central laboratory. Apart from the need for reliable and rapid diagnosis in the control of contagious disease, such regional laboratories would serve as depots where vaccines, sera and diagnostic agents can be stored under suitable conditions and distributed to practitioners without delay. The personnel of such laboratories would be conversant with local conditions and would serve as advisers to practitioners and breeders in their areas regarding not only disease, but also breeding and the maintenance of health. These laboratories could also devote their attention to local problems, and should have facilities for P.M., histological, bacteriological and parasitological examinations. Detailed and specialized investigations would be referred by them to the central laboratory. Regional laboratories should also furnish library facilities and have a conference room where local associations could meet for papers and discussions.—GWILYM O. DAVIES.

## OFFICIAL AND OTHER REPORTS

AUSTRALIA, NEW SOUTH WALES. (1938). **Live Stock Diseases Report (No. 13). Recording Control Work during the Year ended 30th June, 1937.** [HENRY, M.] pp. 24. 5 tables. Sydney: David Harold Paisley, Govt. Printer. [8vo].

The outstanding feature of the year was the invasion of N.S.W. by the cattle

disease known as ephemeral fever, or " three-day sickness ". The history of the spread of this disease is traced in some detail.

ANIMAL DISEASES.—Two cases of JOHNE'S DISEASE are recorded. Outbreaks of ANTHRAX, BLACKLEG, PIROPLASMOSIS and CONTAGIOUS PLEURO-PNEUMONIA are described.

On several occasions heavy coccidiosis infections in lambs were diagnosed; it is necessary to differentiate this condition from parasitic gastro-enteritis. Losses from pregnancy toxaemia in sheep were severe owing to adverse seasonal conditions in certain parts of the State. Poor nutritional conditions were evident in all cases.

A table shows the relative incidence of sheep lice and sheep keds in N.S.W. and at the same time indicates the number of holdings quarantined and the number of sheep involved. Eradication of the cattle tick (*Boophilus microplus*) has been further advanced, the year under review showing probably the most important step forward ever recorded in Australia in the campaign against this parasite. It involved repeated dipping, at 14-day intervals, of 65,500 cattle, 550 sheep and many horses. Chorioptic mange of horses has become of considerable importance in certain areas, and a number of community dips have been established.

The year was unfavourable for the development of helminth infestation, so there was little loss from this cause. The wide-spread use of carbon tetrachloride has made chronic fluke disease (FASCIOLIASIS) a rarity, but on the other hand losses from acute fluke infestation and " black disease " (INFECTIOUS NECROTIC HEPATITIS) have been of increasing importance.

POULTRY DISEASES.—The following are briefly mentioned :– pullorum disease, fowl cholera, coccidiosis, fowl pox, laryngo-tracheitis, entero-hepatitis, neuro-lymphomatosis gallinarum, enteritis, leucoses, erythromyelosis, sinusitis in turkeys and necrosis of digits.

GLENFIELD VETERINARY RESEARCH STATION.—A great deal of routine diagnostic work was carried out, particularly in relation to CONTAGIOUS BOVINE ABORTION and CONTAGIOUS BOVINE PLEURO-PNEUMONIA (complement-fixation test). Research was carried out on the following problems :– CONTAGIOUS BOVINE MASTITIS, SALMONELLOSIS of stock, CONTAGIOUS BOVINE ABORTION, EPHEMERAL FEVER of cattle, NUTRITIONAL ANAEMIA of sheep, sheep BLOWFLY, rugging of sheep, TOXAEMIC JAUNDICE of sheep, ICTEROHAEMOGLOBINURIA of calves, certain poultry diseases, and poisonous plants.

Other sections of the report contain a brief discussion on animal husbandry, particularly in relation to feeding, overseas quarantine, border control, export of stock, treatment of stock on Government farms, inspection of dairy herds, Swine Compensation Act, livestock statistics, etc.—H. McL. GORDON.

COLONY AND PROTECTORATE OF KENYA. (1938). **Annual Report of the Veterinary Department, 1937.** [MULLIGAN, E. J.] pp. 121. Numerous tables, 1 chart, 1 map. Nairobi: Govt. Printer. [8vo] [Shs. 2/50].

GENERAL.

In June, 1937, the former " Animal Industry Division " of the Department of Agriculture became an autonomous " Veterinary Department ". The staff was reorganized, and now consists of the Director (Mr R. DAUBNEY), two Deputy-Directors (Mr E. J. MULLIGAN, field services, and Mr J. R. HUDSON, laboratory services), eight veterinary field officers, two veterinary research officers and one entomologist (apart from sundry other non-veterinary posts). The research section of the report is not separate as in previous years, and it is therefore dealt with in the text below. Climatic conditions were favourable, and grazing was the best for many

years. Important conclusions in a report of the Meat and Livestock Inquiry Committee included energetic measures to deal with overstocking in native areas: establishment of a meat-export trade appeared essential to the survival and development of agriculture, and a trade in cold-stored meat was envisaged. RINDERPEST is the chief problem, but new immunization methods render it less formidable. The development of a cheap but effective method of immunization for use in native areas (in the form of goat-passaged virus) is viewed with optimism, though difficulties of preservation and transport must be overcome. Game are not considered a danger in absence of active disease in cattle.

### ANIMAL DISEASES.

SETTLED AREAS.—There were 29 outbreaks of ANTHRAX, three cases of ULCERATIVE LYMPHANGITIS and 160 outbreaks of BLACKLEG. Forty-one outbreaks of EAST COAST FEVER occurred in " clean " areas and 105 in enzootic areas. There were four outbreaks of RIFT VALLEY FEVER, over 1,000 lambs having died in one outbreak. Thirty-eight outbreaks of RINDERPEST occurred, 18,301 serum-virus, 215 serum, 2,556 vaccine, and 8,958 vaccine-virus inoculations were carried out. There were ten outbreaks of FOOT AND MOUTH DISEASE. Forty-nine cases of HORSE-SICKNESS were noted, and precautionary vaccinations accounted for a low death rate. Three cases of RABIES in jackal were confirmed. Other diseases reported are summarized.

NATIVE RESERVES.—Sporadic cases of ANTHRAX occurred. There were many outbreaks of BLACKLEG and there was a much increased demand for vaccination. CONTAGIOUS BOVINE PLEURO-PNEUMONIA was still prevalent in several reserves and 228,625 vaccinations were effected. TRYPANOSOMIASIS was prevalent in many areas. The incidence of EAST COAST FEVER in some areas was not so great as in previous years. 79,518 serum-virus and 50,752 vaccine inoculations were carried out in controlling numerous outbreaks of RINDERPEST. One serious outbreak of FOOT AND MOUTH DISEASE and several minor ones are recorded.

### ANIMAL HUSBANDRY.

Shade-drying of hides was more widely practised and hide and skin exports were valued at £300,352 as compared with £191,421 in 1936.

### RESEARCH.

Despite shortage of staff the Department carried out much important research in addition to the work of routine diagnosis and preparation of a large variety of vaccines, drugs, etc.

DISEASE CONTROL.—In work on RINDERPEST, Muktesar goat-passaged virus produced a mortality of 16-25% in local cattle, but 30 c.c. doses of serum gave protection to animals inoculated with this virus. When preceded by tissue vaccine that virus gave good results. Methods of ensuring a reasonably constant virus content of goat-virus products are being investigated, since variations in virus content probably account for many failures to immunize in field inoculations. Passage of Kabete virus through goats was continued and reached its 160th transfer. Other strains were also set up. The virus is becoming adapted to goats and definitely attenuated for cattle. Inoculation with either Muktesar or Kabete goat-passaged virus seems to cause a tendency for breakdown to coccidiosis. Preliminary experiments on cultivation of the virus in tissue-culture were made.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA was set up in experimental animals by intravenous injection of thoracic lymph in agar. Experiments on a fatty-base vaccine gave promising results.

In work on CONTAGIOUS ABORTION, inoculation of a fatty-base vaccine did not lead to abortion, but produced an infection comparable with the natural one.

Experiments were made on survival of *Brucella abortus* and *Br. melitensis* organisms frozen, dried, and stored *in vacuo*.

Details are given of experimental vaccine for RIFT VALLEY FEVER. A hyper-immune bovine serum appeared to give good results in lambs.

The virus disease of fowls occurring in Kenya and thought to be NEWCASTLE DISEASE was proved, by cross-immunity tests carried out at Weybridge, to be identical with this disease.

A " rickettsia infection " of the dog is described. Work on " specific transmissible petechial fever of cattle " was continued and it was shown to be in no way related to THREE-DAY-SICKNESS or to HEARTWATER.

NAIVASHA EXPERIMENTAL STATION.—Numerous experiments and surveys in connexion with the oestrous cycles of cattle and sheep, artificial insemination, fertility in bulls, etc., are described. An enlargement and fibrosis of the epididymis in bulls was suspected to be caused by an infection obtained from the cow and was a common cause of sterility. Zebu bulls showed a high fertility. Pregnancy diagnosis tests on 89 mares gave 98·1 % correct results.

TICKS AND EAST COAST FEVER.—Exposure to a low temperature for three days did not prevent development of theileria in the tick *Rhipicephalus appendiculatus*. Under experimental conditions *Hyalomma dromedarii* and *H. anatolicum* were shown capable of transmitting *Th. parva*.

TSETSE FLY.—Surveys were made and reclamation initiated or continued in several areas. New information on habits of *Glossina fuscipleuris* was gained. Breeding places were described and pupae collected for the first time.—H. E. H.

CYPRUS. (1938). **Annual Report of the Veterinary Service for the Year 1937.** [ROE, R. J.] pp. 9. 2 tables. Nicosia: Cyprus Govt. Printing Office. [fcp].

ANIMAL DISEASES.—No serious outbreaks occurred in cattle or equines. Routine vaccination of livestock against ANTHRAX was again markedly successful, losses from this disease being estimated at £300 as compared with an estimated loss of £20,000 p.a. before vaccination was practised. 532,493 animals were vaccinated. Vaccination was completely effective for sheep, but occasional breakdowns occurred in goats. Vaccine was still effective after storage at 30°-35°F. for eleven months.

TUBERCULOSIS and CONTAGIOUS ABORTION appear to have been eradicated.

Overstocking and severe HELMINTHIASIS of sheep and goats were aggravated in the winter of 1936-1937 by exceptionally cold and wet weather, and heavy mortality resulted. A number of outbreaks of CONTAGIOUS PUSTULAR DERMATITIS in sheep and goats also occurred at this time. At the close of the year climatic conditions were more favourable.

Preliminary work on the incidence of CATTLE WARBLES and experimental treatment in one area indicated that heavy loss is caused by the pest and that extensive measures for its control would be practicable. Arrangements were made to carry out more extensive tests in 1938.

RESEARCH.—The work of the laboratory section was curtailed owing to leave arrangements; this work included preparation of anthrax vaccine, fowl pox and fowl typhoid vaccines, and examinations of 580 specimens submitted to the laboratory. Progress in a parasite survey and formation of a museum collection of parasites is recorded.

GENERAL.—Licensing of stallions in Cyprus has resulted in steady improvement in horses used for mule-breeding. Meat inspection records indicate that ECHINOCOCCOSIS is the chief cause of condemnation.—H. E. HARBOUR.

MALAYA. (1938). **Report on the Veterinary Departments for the Year 1937.** [WHITWORTH, S. H.] pp. 104. 3 plates, 16 tables, 1 map. Kuala Lumpur: Govt. Printer [8vo] [$1] [2s. 4d.]

Organization and staff, finance, traffic in animals, animal slaughter and meat inspection, and survey of livestock are dealt with in considerable detail in the opening sections of the report [pp. 1-20]. The European staff numbered 11 and the native staff 116. Numerous statistics are provided. Observations by the Veterinary Officer, Perak (ORR, W.) on certain pathological conditions commonly seen in swine in local abattoirs (focal cirrhosis of liver, " glandular abscesses ", inflammatory changes of the kidney) led to the suggestion that migratory helminth larvae might play a major part in establishing foci of infection. Damage to tissues is probably caused both by progress of larvae and by introduction of pathogenic bacteria.

ANIMAL HUSBANDRY.—Progress is recorded in the various States in improvements of local methods of animal husbandry and of local breeds of stock by establishment of livestock shows, propaganda, importation of bulls, improvements in dairy hygiene, establishment of grazing reserves, etc. The section also includes interesting and detailed observations on the origin, economics, and general management of local breeds of cattle, buffaloes, sheep, goats, and swine.

ANIMAL DISEASES.—ANTHRAX occurred in buffaloes and oxen imported from Siam. STRANGLES occurred in newly arrived young racehorses from Australia. The incidence of TUBERCULOSIS was low; precautions against its introduction in breeding stock are taken. Sporadic cases of TRYPANOSOMIASIS were diagnosed in buffaloes and dogs. PIROPLASMOSIS and ANAPLASMOSIS affect imported cattle, local [Zebu] cattle being premune. Two fatal cases occurred in imported Friesian cows. Acaprin is used in treatment (1 c.c. of a 5 % solution per 100 lb. body weight), generally with success.

Numerous outbreaks of FOOT AND MOUTH DISEASE occurred and are described in detail. The disease was usually mild, and infectivity high. Mortality was mainly confined to young calves. The virus appeared to be of the same strain as in 1936 outbreaks, since cattle infected then withstood the later infection. Goats were suggested as active agents in spreading the disease, and the importance of very thorough examination of imported goats is stressed. The disease was controlled by quarantine and regulation of movements, but control was often made difficult because of the insanitary surroundings of cattle sheds, inadequate accommodation for sick and contacts, and lack of co-operation of owners. Generally the duration of the disease was about a month in each centre.

Three fatal cases of HAEMORRHAGIC SEPTICAEMIA occurred in buffaloes affected with FOOT AND MOUTH DISEASE. It is suggested that lesions of this disease provided entry for the *Pasteurella*. Numerous outbreaks of SWINE FEVER occurred.

Twenty-five deaths occurred out of 28 detected cases in outbreaks of INFECTIOUS CAPRINE PLEURO-PNEUMONIA in Perak. Detailed observations on symptoms and P.M. lesions are recorded.

RABIES was prevalent in Northern Kedah and Perlis, and two cases occurred in Kelantan. Muzzling orders were maintained and stray dogs were destroyed. The Settlement of Singapore was declared a rabies-infected area in August 1937, for the first time since 1907. The infection originated in a dog introduced from the Philippine Islands; this was a case of furious rabies. Succeeding cases were of the dumb type. Sixteen pages of the report are devoted to a detailed description of the outbreak and its control. 12,000 dogs in the settlement were vaccinated, only four of which subsequently developed the disease. 15,802 uncontrolled dogs were shot. Incubation periods ranged from 24 to 75 days. No human cases occurred.

CANINE and FELINE DISTEMPER of a virulent type occurred in many parts of Malaya during the year.

Several cases of ARSENICAL POISONING were confirmed.

Among poultry, a number of outbreaks of DIPHTHERITIC STOMATO-PHARYNGITIS occurred, mortality often approaching 100%. Transmission experiments suggested that the disease can develop and terminate fatally without development of the typical mouth and bowel lesions by which it is usually diagnosed.

RESEARCH.—An experiment on 109 buffaloes gave no confirmation of the suggestion that anthrax bacilli can occur in the blood of normal healthy cattle. Acid-alcohol-fast bacteria resembling *Mycobacterium tuberculosis* were recovered from the lung and bronchial glands of a pig and were cultured. Inoculation experiments were inconclusive as to pathogenicity. Lesions in the form of indolent, ulcerating sores, known as KRIAN SORE, occurred in cattle, usually on the limbs. A detailed account is given. Marked infiltration with eosinophiles suggested a parasitic infection and it was thought that this might be associated with FILARIASIS. Detailed observations on CONTAGIOUS ECTHYMA of GOATS are given. An experiment on the efficacy of Behring Swine Fever serum against the local strain of virus was inconclusive. A list of helminth parasites of livestock occurring in Malaya is given, together with comments on associated pathogenesis and symptoms.

—H. E. HARBOUR.

JAMAICA. (1938). **Report of the Senior Veterinary Officer for Year 1937.** [LOCKETT, S.]—*Rep. Dep. Agric. Jamaica 1937.* pp. 31-41.

General weather conditions were favourable to livestock.

ANIMAL DISEASES.—Outbreaks of equine strangles, anthrax, ulcerative lymphangitis of mules, blackleg, texas fever, gall-sickness, swine fever and dog distemper are recorded, and the methods of dealing with them are noted. Treatment of ULCERATIVE LYMPHANGITIS of mules by intravenous injection of neoarsphenamine gave favourable results. Acaprin is being tested as a curative agent in PIROPLASMOSIS, but no results are recorded. The island has been free from FOOT AND MOUTH DISEASE since 1926. In outbreaks of SWINE FEVER the serum-virus method of immunization is being instituted, legal quarantine measures for suppression by isolation having failed.

STOCK FARM, HOPE.—Tuberculin tests of farm cattle over the period 1927-37 are recorded. Abortion and associated troubles were a serious problem. Eleven non-breeding cows were treated by ovarian manipulation *per rectum* accompanied by intramuscular injections of wheat germ oil, but without success. FOWL POX and a subacute type of FOWL CHOLERA are recorded.

STUD FARM, GROVE PLACE.—PSOROPTIC MANGE of equines was controlled by treatment with lime-sulphur wash. The disease is wide-spread in the island.

—H. E. HARBOUR.

UNITED STATES OF AMERICA, MICHIGAN. (1937). **Report of the Division of Veterinary Science, Michigan State College of Agriculture and Applied Science, East Lansing, 1937.** [GILTNER, W.] pp. 36. 14 tables. [8vo].

A brief general report is given of the activities of the Veterinary College, and is followed by the reports of the various departments.

ANIMAL PATHOLOGY. [KILLHAM, B. J.]—The scope of the Federal project for BRUCELLA INFECTION CONTROL increased and continued to supersede the State scheme. The incidence of infection in untested herds was thought to be about 12%. For the year ended October 31st, 1936, a total of 217,162 cattle were tested

and 7,927 reactors were found. On November 1st, 1936, 16·6% of the breeding cattle in the State were reported to be under supervision.

The number of horses treated during the year for ecto- and endoparasites was 49,049.

EXPERIMENTAL WORK. [MALLMANN, W. L.] The amount of service work in connexion with MASTITIS decreased as routine tests were taken over by the Animal Pathology Laboratory, and only tests whose results were of value in research were done in this section. 5,000 milk samples were tested, and many cultures were made and the organisms identified. Work on the control of moulds on eggs in cold storage, and on the bacteriological value of ultra-violet rays was continued.

H. J. STAFSETH published a report on streptococcal infections in dogs. Work on the chemical composition of *Salmonella pullorum* with a view to improving the antigen used in the rapid whole blood test was published by W. J. STAHL. The work on COCCIDIOSIS was suspended. 3,678 poultry specimens were submitted for examination, a decrease of 90 on the previous year.

## BOOK REVIEWS

HOPFENGÄRTNER, M. [Veterinärmedizinalrat an der Bayer. Veterinärpolizeilichen Anstalt Schliessheim]. (1939). Leitfaden der tierärztlichen Lebensmittelüberwachung. **[Introduction to Veterinary Food Supervision]**. pp. xv + 240. 5 figs., 5 tables. [Numerous refs.] Stuttgart: Ferdinand Enke. [8vo] [RM. 12].

The *raison d'être* of this book was the Reichstierärzteordnung of 1936, by which it was ordained that the health of the German people, as regards the supply of food of animal origin was concerned, should be entrusted to the veterinary profession. The author has been engaged in giving special courses of instruction to the veterinary food inspectors of Bavaria, and this book is the outcome.

The contents are as follows :– (A) laws concerning food of animal origin ; (B) veterinary instruction on the inspection of such food (general information on carcasses of mammals ; poultry, game and wildfowl ; fish, molluscs, crabs, frogs, etc., and eggs and milk) ; (C) practical technique for food inspection ; (D) age estimation of the animals named above, and finally a select bibliography.

The book is excellent as a reference work on scientific and technical food inspection, particularly as regards the identification of tissues and organs of the numerous animals dealt with ; its value therefore extends beyond Germany. There is a good index, and the printing is quite satisfactory.—J. E.

FRANCKE, G. [Oberregierungs- und Veterinärrat a.D.]. (1937). Das Fleischbeschaugesetz. **[The German Meat Inspection Law]**. pp. 551. Wittenberge: Gebr. Bischoff. [8vo] [RM. 5.50].

This is a revised edition of the book which first appeared in 1929. Since then the law has been changed, by the 1937 " Law for the Alteration of the Meat Inspection Law ". The book includes the new text, and also sections of other laws which regulate the work and certain social conditions of all who are engaged in meat inspection and abattoir work, *e.g.* trichina inspection, animal protection, and also the taxes and insurance, etc. to which those employed in these services are liable.

It is of a handy size and has a good index, and is a useful reference book.—J. E.

PLIMMER, R. H. A. [D.Sc., Professor of Chemistry in the University of London, at St. Thomas's Hospital Medical School]. (1938). **Organic and Bio-Chemistry.** pp. x+623. 69 figs., 1 plate, numerous tables. [Numerous refs.] London, New York, Toronto: Longmans, Green and Co. [6th Edit.] [8vo] [21s.]

The appearance of the sixth edition of this excellent book by Dr Plimmer affords further evidence of its wide popularity and usefulness. Originally written in 1910 as a book on practical physiological chemistry, in 1915 it was enlarged so as to include practical organic chemistry also. In 1926 it was again enlarged to include a more extensive treatment of theoretical organic chemistry, and this met with such general approval by readers that the author amplified still further the theoretical aspects of both the organic and the physiological chemistry sections, and changed the title to its present form, although the book still retains its practical character. The latest edition is substantially the same as its predecessor, with the inclusion of some new material and a revision of some of the older parts to bring them into line with modern knowledge.

The object of the author to " consider organic chemistry as the basis of physiological chemistry, or rather, the two as one subject—biochemistry " and its realization in the present form has been amply justified in the response that the book has already received, and with the incorporation of the same material revised in the light of modern knowledge there is every good reason why the book should still maintain its high popularity with both teachers and students, in the widest sense.

The fundamentals of both organic and physiological chemistry are adequately covered, and although, naturally, the more advanced knowledge of each subject could not possibly be included in a book of such modest size, the material contained in its 600 pages provides a very thorough treatment of both subjects, including full details of practical methods that have stood the test of time and experience. The book can be warmly recommended by one who derived much knowledge and help from one of its earlier editions.—ALFRED EDEN.

VORONOFF, S. (1939). Greffe des glandes endocrines. **[Endocrine Gland Grafting].** pp. xii + 286. 96 figs. Paris: G. Doin & Co. [8vo] [Fr. 120].

There is no doubt that the secretory activity of the glands of internal secretion varies in different individuals, and that certain symptoms or syndromes may follow when the rate of secretion is decreased.

The author has attempted to replace the secretory activity of deficient glands (thyroid, parathyroid, testis, or ovary) by grafting the glands from monkeys into human beings. He describes in detail the precautions to be taken in the technique of grafting, and rightly stresses the importance of grafting small pieces and of insuring vascularization. The operative techniques are profusely illustrated.

The first question arising is whether glands grafted from the monkey into the human being will take, and be functional. In view of the importance of this question one would expect it to be treated fully, and with detailed evidence. Unfortunately, the data presented are few and, on the whole, unconvincing.

The aspect of the author's work which has excited most interest has been his attempt to produce rejuvenation by gland grafting. There exist, however, no reliable objective criteria for measuring the age of an individual, and the absence of any attempt to control the results (which are strikingly illustrated) tends to induce scepticism.

The recent development in the work on sex hormones has put at our disposal other methods with which more exact and reliable replacement of the endocrine activity may be obtained.—J. M. ROBSON.

KLETT, R. [Prof. Dr. med. vet. Tuttlingen (Württemberg)], & METZGER, R. [Veterinärrat Dr. med. vet. Säckingen (Baden)]. (1938). Uebele-Handlexikon der tierärztlichen Praxis. 1. Band. [**Uebele's Handbook of Veterinary Practice. Vol. 1**]. pp. viii + 859. Ulm, Donau : J. Ebner'sche Verlagsbuchhandlung. [5th Edit.] [8vo] [RM. 52].

This book occupies the same position in Germany as does BANHAM and YOUNG's " Posology " in Great Britain. It first appeared in 1909, and the succeeding four editions were prepared by Professor KLETT and Dr METZGER.

The book is divided into :– sections on drugs arranged according to use under some 80 headings ; lists of drugs in alphabetical order with brief details concerning their composition, usage, dosage, and indications ; tables, and chapters of general information of value in pharmacy ; prescriptions, and addresses of drug manufacturers and similar information. Drugs included are those listed in the Deutsche Arzneibuch : among them are numerous proprietary preparations of which the composition has been divulged.

The book is doubtless considered indispensable in Germany. It is also of great value to readers of German veterinary literature who are often puzzled over the nature of the proprietary remedies therein mentioned.—J. E.

LÄGEL, R., Jr. [Dr., Rechtsanwalt], DOENECKE, H. [Prof. Dr., Direktor des Veterinär-Instituts und der Tierklinik der Universität Breslau], JAKOB, H. [Prof. Dr., Direktor der medizinischen und forensischen Veterinärklinik der Universität Giessen], OPPERMANN, T. [Prof. Dr., Direktor der medizinischen und forensischen Klinik der Tierärztlichen Hochschule Hannover], & SCHÖNBERG, F. [Prof. Dr., Direktor des Instituts für tierärztliche Lebensmittelkunde der Tierärztlichen Hochschule Hannover]. (1938). Der Tierärzt im Recht. Tierärztliche Rechts- und Gesetzeskunde zum praktischen Gebrauch und zum Studium für Tierärzte und Rechtswahrer. [**Law in Relation to the Veterinary Surgeon**]. pp. vii+147. [Numerous refs.] Stuttgart : Ferdinand Enke. [8vo] [RM. 6.80].

Heretofore German veterinarians have had no single source of reference or information on all aspects of the law concerning the various aspects of their work. LÄGEL has now provided such a book, which he wrote in collaboration with the four well known veterinary authorities.

There are three parts, dealing with :– (1) professional veterinary jurisprudence ; (2) private veterinary jurisprudence, and (3) the veterinarian in common law. The first part is concerned with the veterinary profession as a whole, as laid down in the Reichstierärzteordnung of 1936, the second deals with the veterinarian's private covenant with his client and the question of his liability for accidents to animals in his care, and also with the ethics of conduct within the profession ; the third covers the veterinarian's public health duties, his part in the sale of drugs, his concern with cruelty to animals, his standing as an expert witness, and his taxes.

Whilst not applying to any country except Germany, the book should appeal to all interested in the law and the veterinary profession.—J. E.

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No. 2.—Issued June. Indexing period previous July—December.

Vols. 1 to 3 (1933, 1934 and 1935) of the Index were produced on a duplicator; from Vol. 4 onwards it has been printed.

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